FX-DS110-COM

Wireless COM Adapter

User's Guide

CONTEC

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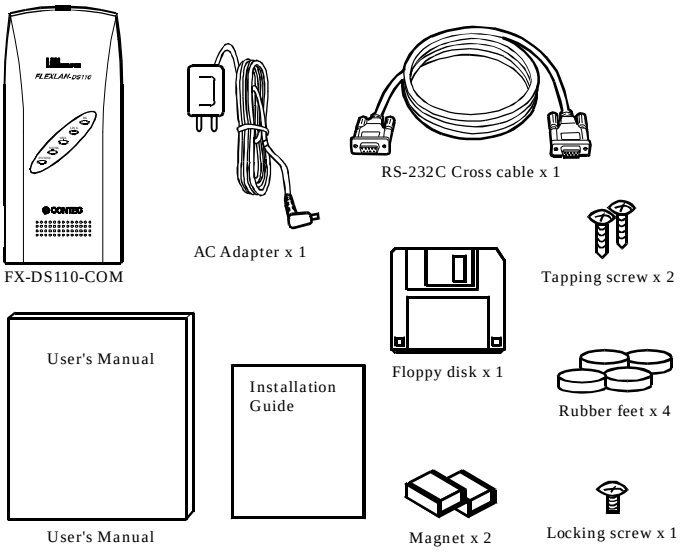
Product Configuration

- FX-DS110-COM…1
- AC Adapter with 1.8m cable…1
- Tapping screws (for mounting on wall, etc.)…2
- Locking screw (for connecting to ground wire)…1
- Magnets (for mounting on metallic surfaces)…2
- Rubber feet…4
- RS-232C Cross cable…1
- Floppy disk…1
- Manual…1
- Installation Guide…1



Check the contents to make sure that you have everything listed above. If you do not have all the items, contact your distributor or CONTEC group office where you purchased.

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1. Introduction

Thank you for purchasing the FX-DS110-COM accesses point.

The FX-DS110-COM is a wireless COM adapter that uses DS spread-spectrum transmission in the 2.4GHz band to connect RS-232C interface devices via a wireless link. As the unit complies with the IEEE 802.11b wireless LAN standard, it can also be connected to a wired LAN via an access point.

This document explains how to use the FX-DS110-COM. Be sure to read it carefully so that you can use the product correctly.

Features

- Connects RS-232C devices via a Wireless.
- Supports both 1:1 and 1:N communications
- Can be connected to a standard LAN via a wireless LAN access point
- Easy setup using the ID switch and MODE switch
- RS-232C supports up to 921.6kbps *
- The wireless communications comply with IEEE802.11b.
- Supports Multi channel (US: 1 ~ 11, EU: 1 ~ 13)
- A software setup utility is included

* Restrictions apply depending on the cable length and the device with which you are communicating.

Terminology/Abbreviations

The following terms and abbreviations are used in this manual for convenience.

Full term	Term used in this manual
FX-DS110-APE, FX-DS110-APL	Access point/AP
A device with the wireless function	User unit/ Wireless terminal
Personal computer	PC

Limited One-Year Warranty

CONTEC Interface boards are warranted by CONTEC Co., LTD. to be free from defects in material and workmanship for up to one year from the date of purchase by the original purchaser.

Repair will be free of charge only when this device is returned freight prepaid with a copy of the original invoice and a Return Merchandise Authorization to the distributor or the CONTEC group office, from which it was purchased.

This warranty is not applicable for scratches or normal wear, but only for the electronic circuitry and original boards. The warranty is not applicable if the device has been tampered with or damaged through abuse, mistreatment, neglect, or unreasonable use, or if the original invoice is not included, in which case repairs will be considered beyond the warranty policy.

How to Obtain Service

For replacement or repair, return the device freight prepaid, with a copy of the original invoice. Please obtain a Return Merchandise Authorization Number (RMA) from the CONTEC group office where you purchased before returning any product.

*** No product will be accepted by CONTEC group without the RMA number.**

Liability

The obligation of the warrantor is solely to repair or replace the product. In no event will the warrantor be liable for any incidental or consequential damages due to such defect or consequences that arise from inexperienced usage, misuse, or malfunction of this device.

Handling Precautions

Take the following precautions when handling this board.

- Do not attempt to modify this device. The manufacturer will bear no responsibility whatsoever for the device if it has been modified.
- Do not store this device in high temperature or low temperature surroundings, or expose it to rapid temperature changes. (Operating temperature range: 0° to 50°C)
- Do not use or store this device where it is exposed to direct sunlight or near stoves or other sources of heat.
- Do not use or store this device where it is exposed to dust or high humidity.(Operating humidity range: 10-90%RH, without condensation)
- This product contains precision electronic elements and must not be used in locations subject to physical shock or strong vibration.
- Do not use or store this device near strong magnetic fields or devices emitting electromagnetic radiation.
- If abnormal smells or heat are noticed, disconnect the power supply immediately.
- In case of abnormal operation or failure, contact the store where this product was purchased.

Precautions for Use

This product is classified as "wireless equipment for stations of low-power data transmissions systems" under the Wireless Telegraphy Act, and does not require a radio transmission license. The law prohibits modification of the interior of this product.

Precautions Related to Service

Clean the FX-DS110-COM by wiping lightly with a soft cloth moistened with water or a cleaning solution.
Take care to avoid the use of benzene, thinners or other volatile solutions which may cause deformation or discoloration.

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Precautions Related to Electromagnetic Interference

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions : (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment complies with part 15 of the FCC rules. Any changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

CAUTION: To comply with FCC RF exposure compliance requirements, a separation distance of at least 5 cm must be maintained between this device and all persons.

About the Manual

This manual consists of the following chapters:

Chapter 1 Introduction

Chapter 2 Overview

Chapter 3 Explanation in Mode of Operation

Chapter 4 Setup

Chapter 5 Settings

Chapter 6 SNMP Agent Functions

Chapter 7 Troubleshooting

Chapter 8 Appendix

Chapter 9 Index

2. Overview

Component Locations

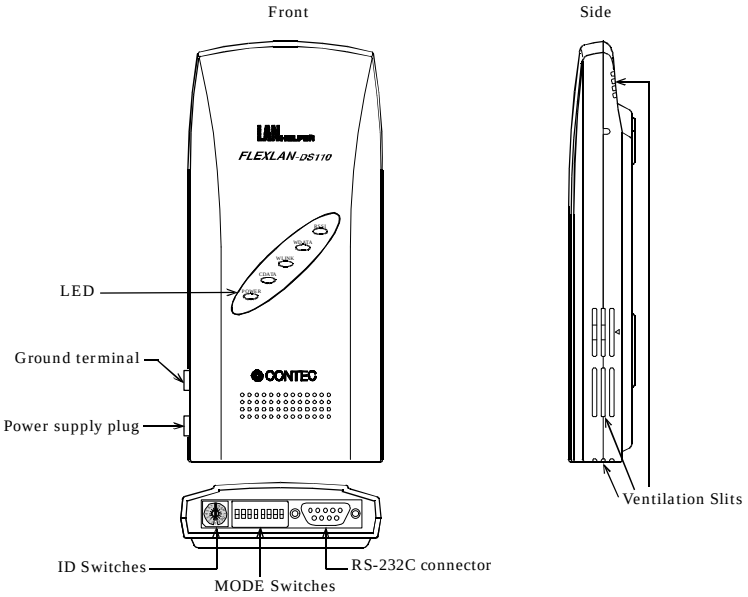


Figure 2.1. Component Locations

Note!

Do not block the ventilation vents as this may result in damage or malfunction due to overheating.

LED

The five LED indicators indicate the sending /receiving status of the wireless or wired LAN, power supply, LAN connection status, etc.

MODE Switches

These are used to initialize the FX-DS110-COM, select the wireless channel and baud rate, and set the operation mode.

ID Switches

Set the Device Number of FX-DS110-COM

LED Indicators

Table 2.1. ADHOC (Simple Mode)

Name	Status	Indicator
POWER	Flashing	Startup, or startup error
	On	Operating
CDATA	Flashing	Receiving COM data
WLINK	On	Through Mode(Opposing device ID specified) The specified device exists. Through Mode(broadcast) or Modem mode Another FX-DS110-COM is present on the network. Virtual COM Mode The RS-232C port is open.
WDATA	Flashing	Receiving wireless LAN data
RSSI	On	A wireless device is present with an RSSI value higher than the RSSI threshold.

Table 2.2. Infrastructure (Standard Mode)

Name	Status	Indicator
POWER	Flashing	Startup, or startup error
	On	Operating
CDATA	Flashing	Receiving COM data
WLINK	On	Wire LAN connection normal
WDATA	Flashing	Receiving wireless LAN data
RSSI	On	The RSSI value for the access point to which the unit is logged in is higher than the RSSI threshold.

Table 2.3. Other

Name	Status	Indicator
POWER	Flashing 2 times	Initialization error
	Flashing 3 times	Firmware writing error
POWER CDATA WLINX WDATA RSSI	All flashing at the same time	Firmware writing in progress

Table 2.4. Other

Name	Status	Indicator
POWER	Flashing 2 times	Initialization error
	Flashing 3 times	Firmware writing error
POWER CDATA WLINX WDATA RSSI	All flashing at the same time	Firmware writing in progress

Mode Switches

These are used to initialize the FX-DS110-COM, select the wireless channel and baud rate, and set the operation mode. The factory default setting is to use the MODE switch settings. The default MODE switch settings are all OFF.
When the device is in its factory default setting state, simple setup can be performed using the MODE switches only. However, you need to use the utility software or a terminal to set the security and other detailed settings.

Table 2.5. Mode Switches

<table>
<tr><th colspan="2">Item</th><th>Description</th></tr>
<tr><td>1</td><td>INIT</td><td>Restore the RP-COM(FIT) to its factory default settings. When this switch is ON, the POWER and COM LED's start to blink.
Turning the switch OFF while the LEDs are still blinking (approx. 3 seconds) restores all settings to their factory default values when the module is next restarted.
* Wait until the POWER and COM LEDs have gone back to their normal states before rebooting or turning off the power.</td></tr>
<tr><td>2,3</td><td>Channel
1, 2</td><td>Selects the wireless channel. You can use the channel setting to divide units into network groups. You can configure four independent network groups using the switch settings.
<table>
<tr><th>SW 2</th><th>SW 3</th><th>Channel</th></tr>
<tr><td>OFF</td><td>OFF</td><td>CH1</td></tr>
<tr><td>OFF</td><td>ON</td><td>CH1</td></tr>
<tr><td>ON</td><td>OFF</td><td>CH6</td></tr>
<tr><td>ON</td><td>ON</td><td>CH11</td></tr>
</table>
The above setting selects CH1, 6 and 11. The channel can also be set in the range 1 to 13 by software (only EU). When setting by software, it is recommended that adjacent groups are separated by at least five channels to prevent interference.</td></tr>
<tr><td>4,5</td><td>Baud Rate
1, 2</td><td>Set the Baud Rate of RS-232C ports.
<table>
<tr><th>SW 4</th><th>SW 5</th><th>Baud rate</th></tr>
<tr><td>OFF</td><td>OFF</td><td>9,600bps</td></tr>
<tr><td>OFF</td><td>ON</td><td>19,200bps</td></tr>
<tr><td>ON</td><td>OFF</td><td>38,400bps</td></tr>
<tr><td>ON</td><td>ON</td><td>115,200bps</td></tr>
</table>
The above setting selects 9,600, 19,200, 38,400 and 115,200bps. The channel can also be set in the range 300, 600, 1,200, 4,800, 9,600, 14,400, 19,200, 38,400, 57,600, 115,200, 230,400, 460,800 and 921,600 by software.</td></tr>
<tr><td>6</td><td>ADHOC/
INFRA</td><td>Wireless of operating Modes
<table>
<tr><th></th><th></th><th>operating mode</th></tr>
<tr><td>OFF</td><td>ADHOC</td><td>Select this when using ADHOC (Simple Mode). All wireless devices operate as peers and communication is performed independently between communicating devices.</td></tr>
<tr><td>ON</td><td>INFRA</td><td>Select this when using Infrastructure (Standard Mode). Communication is performed via access points.</td></tr>
</table></td></tr>
<tr><td>7</td><td>Through/
MODEM</td><td>Set the operating mode
<table>
<tr><th></th><th></th><th>operating mode</th></tr>
<tr><td>OFF</td><td>Through</td><td>Select this when using Through Mode.</td></tr>
<tr><td>ON</td><td>MODEM</td><td>Select this when using Modem Mode.</td></tr>
</table>
* Virtual COM Mode is set by software.</td></tr>
<tr><td>8</td><td>TERM</td><td>Changes to Terminal Mode. Use the utility software for the COM connection. Set this ON when performing maintenance on the FX-DS110-COM or using modem commands with “echo back ON”.</td></tr>
</table>

All switches are set to OFF at factory.

ID Switches

This sets the device ID for the FX-DS110-COM.
The setting range is 0 to F (0 to 15), but the ID can be set in the range 0 to 254 by software.
The factory default setting is that the ID switch setting is used and the device ID is set to “0”.

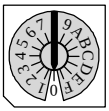


Figure 2.2. ID Switches

3. Explanation in Mode of Operation

Wireless Mode

ADHOC (Simple Mode) and Infrastructure (Standard Mode/Compatible Mode) can be selected for wireless operation. The operation of wireless communications is different for each mode. In ADHOC (Simple Mode), all wireless devices operate as peers. In Infrastructure (Standard Mode/Compatible Mode) communication is performed via access points.

ADHOC (Simple Mode)

In ADHOC (simple mode), all wireless devices are paired, and can use wireless communication with the other device in the pair.

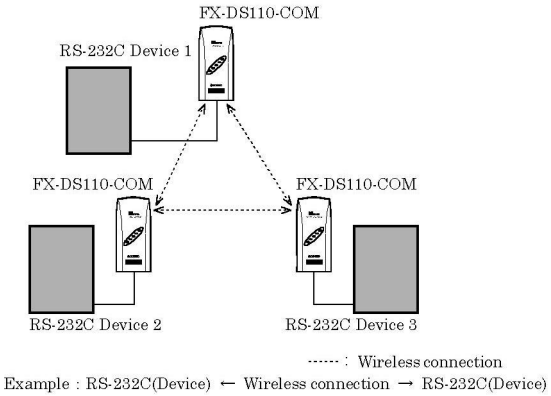


Figure 3.1. ADHOC

Note!

When configuring a system using ADHOC (Simple Mode), restrict the system to within a range where all devices can communicate with each other. If devices are separated by too great a distance or if walls or other obstacles block communications, this will cause the "hidden device" problem and reduce throughput.

Infrastructure (Standard Mode / Compatible Mode)

This mode allows the use of multiple AP's to configure wide-area wireless LAN's. All communication between wireless terminals must go through an AP.

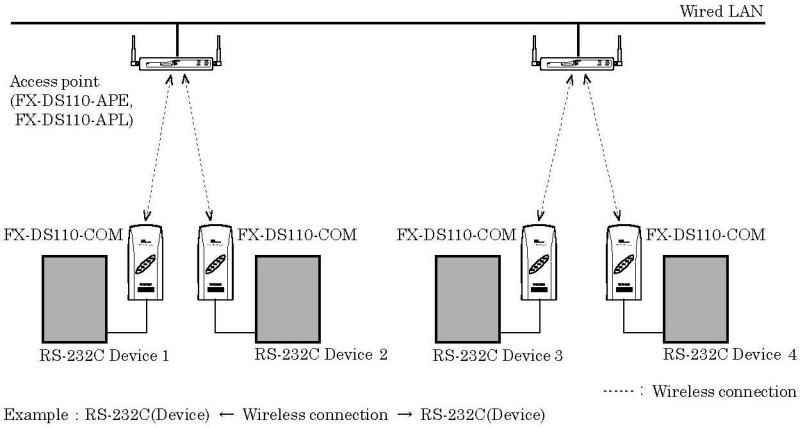


Figure 3.2. Infrastructure

Through Mode

This mode transfers data directly from the RS-232C device connected to the FX-DS110-COM to the FX-DS110-COM with the same device ID or with the specified device ID. This means communications can be performed in the same way as if the 1-to-1 connection via an RS-232C cable has been replaced with a wired network.

Existing applications that operate using RS-232C can continue to be used without any changes.

However, the RS-232C parameters of the FX-DS110-COM and the connected device must be the same.

You can use the utility software to specify the device ID of the other FX-DS110-COM (opposing device ID).

If the opposing device ID is set in the range 0 to 254, communication is performed with the device with the specified ID. If 255 is specified, transmissions are sent to all FX-DS110-COM devices in the network.

The wireless connection can be used in both ADHOC modes whereby FX-DS110-COM devices communicate directly or in Infrastructure mode where communication is via access points.

Notes!

- *If using broadcasting, ensure that all FX-DS110-COM units have different device IDs.*
- *Device ID 255 is reserved for broadcast use.*
- *If connecting to an Ethernet network via an access point, set appropriate values for the IP address, subnet mask, and similar parameters to prevent any problems on other LAN devices.*
- *Although, existing application can generally continue to be used unchanged, note that they may not operate correctly if particular RS-232C control procedures are used (see below).*
  (Example) - Baud rate changed during operation
  - Hardware signals used for proprietary purposes other than flow control
  - RI signal used

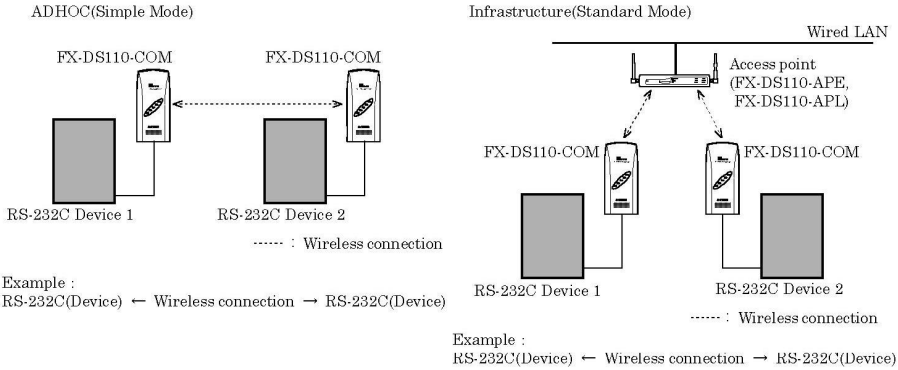


Figure 3.3. Through Mode

Modem Mode

This mode performs RS-232C communications on a packet-by-packet basis using special commands to control the FX-DS110-COM. As the device ID is added to the transmitted packet data, communication can be performed with multiple FX-DS110-COM devices.

As operation is controlled by commands, the device connected to the RS-232C port of the FX-DS110-COM requires special application software. Also, the type of data being sent or received can be identified as either text data, binary data, Ethernet data, or UDP/IP data. In particular, UDP/IP data can be used to communicate directly with a Socket interface on a host PC.

The wireless connection can be used in both ADHOC mode whereby FX-DS110-COM devices communicate directly or in Infrastructure mode where communication is via access points.

The following three types of communication are supported.

(1) Communication with a specified device ID
Communication can be performed between RS-232C devices connected to FX-DS110-COM units.

(2) Communications with UDP/IP Socket
Communications can be performed via access points with Windows PC and workstation.

(3) Build and transmit or receive Ethernet frames
Communications can be performed via access points with devices connected to the Ethernet using protocols other than UDP/IP.

Notes!

- *Ensure that the specified device IDs are unique*
- *Device ID 255 is reserved for broadcasting.*
- *To avoid any adverse effects on other LAN devices, set the IP address, subnet mask, and other network parameters to appropriate values.*

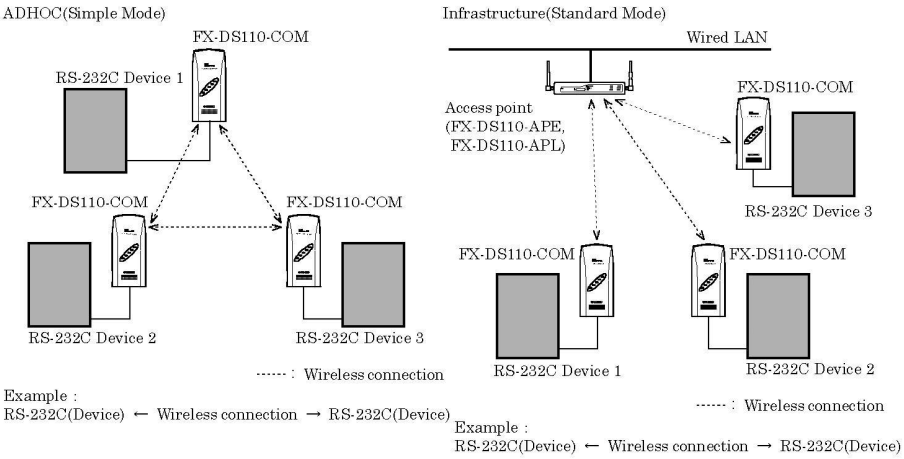


Figure 3.4. Modem Mode

Virtual COM Mode

Virtual COM driver mode for Windows converts COM data to LAN data to control the RS-232C port on an FX-DS110-COM via the LAN. This has the effect of extending a 1-to-1 RS-232C cable connection to operate via the LAN and allows existing applications that use RS-232C to continue to be used changed.

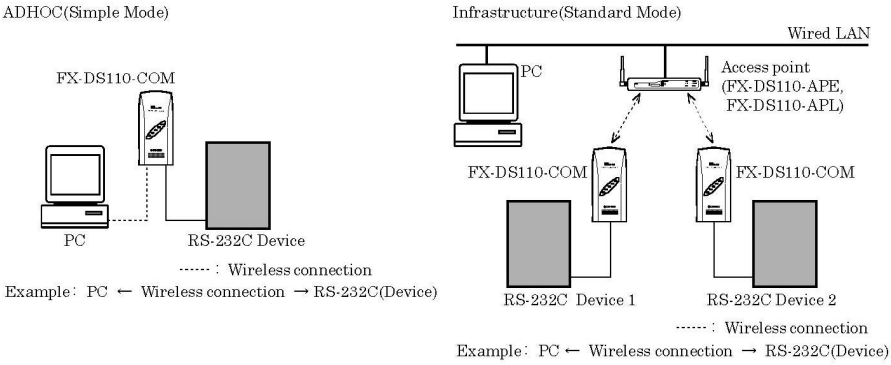


Figure 3.5. Virtual COM Mode

Note!

To avoid any adverse effects on other LAN devices, set the IP address, subnet mask, and other network parameters to appropriate values.

Terminal Mode

This mode is used to access the FX-DS110-COM via the RS-232C port to perform maintenance using the utility software or modem commands.

Setting the ID switch to “8” forcibly sets the FX-DS110-COM to terminal mode.

When set to terminal mode, the RS-232C settings are as follows.

- Baud rate : 9600bps
- Data bit : 8bit
- Parity : None
- Stop bit : 1bit
- Flow control : Hardware

Wireless of operating Modes and Communications

Table 3.1. Wireless of operating Modes and Communications

FX-DS110-COM	FX-DS110-PCC	FX-DS110-APE	FX-DS110-APL
ADHOC (Simple Mode)	ADHOC (Simple Mode)	Simple Mode	ADHOC (Simple Mode)
Infrastructure (Standard Mode)	Infrastructure (Standard, BRouter)	Standard, Brouter	Infrastructure (Standard)
Infrastructure (Compatible Mode)	Infrastructure (Compatible)	Compatible	Infrastructure (Compatible Mode)

4. Setup

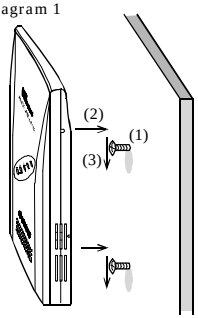
Wall Installation

Using the Mounting Screws (Included)

Place the screws in the wall according to the mounting diagram, then mount the unit.

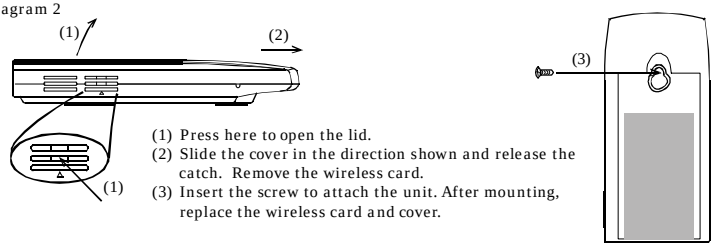
It is also possible to remove the cover from the unit, then remove the wireless card and screw the unit onto the wall directly.

Diagram 1



(1) Place the screws in the wall according to the mounting diagram (2 screws).
(2) Position the AP unit so that the two wall mount holes in the AP unit fit over the two screws in the wall.
(3) Slide the AP unit down to hold it in place.

Diagram 2



(1) Press here to open the lid.
(2) Slide the cover in the direction shown and release the catch. Remove the wireless card.
(3) Insert the screw to attach the unit. After mounting, replace the wireless card and cover.

Figure 4.1. Wall Installation

Note!

Do not obstruct the ventilation slits. This can cause the temperature inside the product to rise and can damage the components inside.

Caution!

Do not install this unit upside down. This will cause heat to accumulate and possible cause fire.

Using the Magnets (Included)

The magnets included with this product can be used for easy mounting and removal on steel desks, partitions, or other metal surfaces.

Notes!

- *Do not place magnets near monitors, floppy disks, or other sensitive objects.*
- *Moving the AP while it is mounted on a steel desk or similar surface can cause paint scratching.*

Attaching and Removing Magnets

To mount the unit using a magnet, push the magnet into the magnet mounting hole in the direction of arrow 1 as shown in Figure 4.2. , then insert the entire magnet into the mounting hole.

Next, slide the magnet in the direction of arrow 2 to hold the unit in place.

To remove, slide the magnet in the direction of arrow 1 in Figure 4.3. , then lift in the direction of arrow 2.

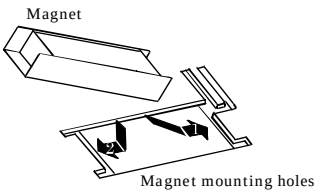


Figure 4.2. Attaching Magnets

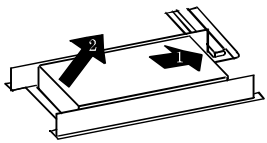


Figure 4.3. Removing Magnets

Mounting on Steel Desks or Partitions

The unit can be mounted directly on steel desks or partitions. Pull lightly to make sure that the AP does not come off easily.

For better receiving sensitivity, mount the antenna against the steel surface.

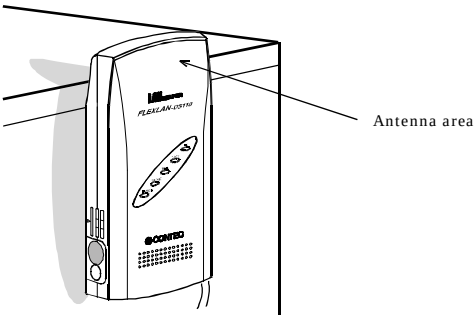


Figure 4.4. Installation on a Steel Desk

Table Top Installation

Use the rubber pads included with the unit.

To install on a table top, choose a sturdy, level surface with a well-ventilated space (approx. 5 cm.) in all directions. Wireless equipment has a larger sending and receiving range when it is in a highly visible location. Choose a location where the sight lines are as clear as possible.

Note!

Do not obstruct the ventilation slits. This can cause the temperature inside the product to rise and can damage the components inside.

Cable Installation

Connect the RS-232C connector to the RS-232C cross cable.

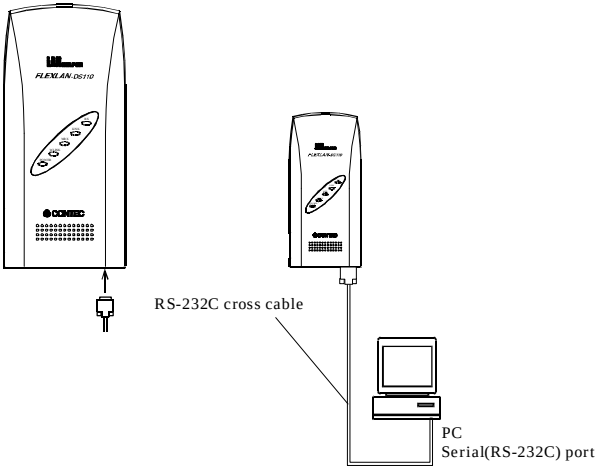


Figure 4.5. Cable Connection

Note!

The FX-DS110-COM operates as a DTE (Data Terminal Equipment) device.
Use a straight-through cable if connecting to a DCE (Data Circuit-terminating Equipment) device.

Connection of a Power Supply

Connect the supplied AC adapter to the power input connector.

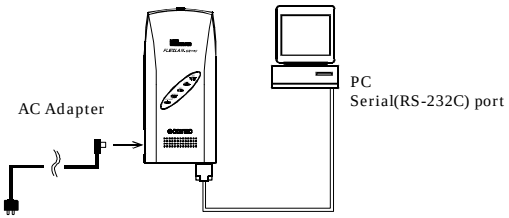


Figure 4.6. Connection of a Power Supply

Note!

Only use the AC adapter supplied with the unit. Unauthorized adapters may cause damage or accidents due to overheating.

Ground Connection

Remove the rubber cover from the ground terminal, and connect the ground wire using the locking screws (included).

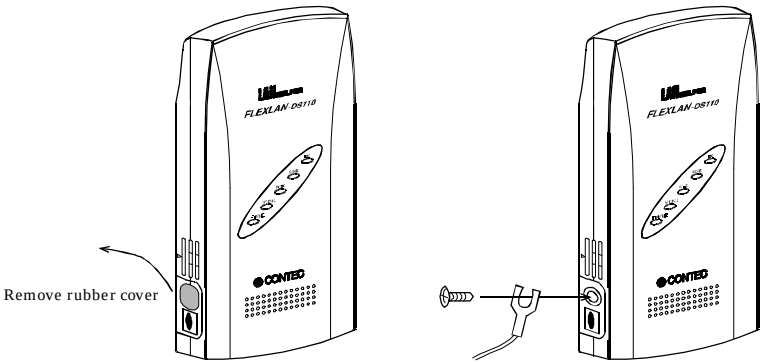


Figure 4.7. Ground Connection

Note!

In some installation environments, the ground terminal may become hot

FX-ANT-P2(option) Connection

CONTEC recommends use of the optional antenna (FX-ANT-P2) if the antenna of the device itself is hidden by an obstruction.

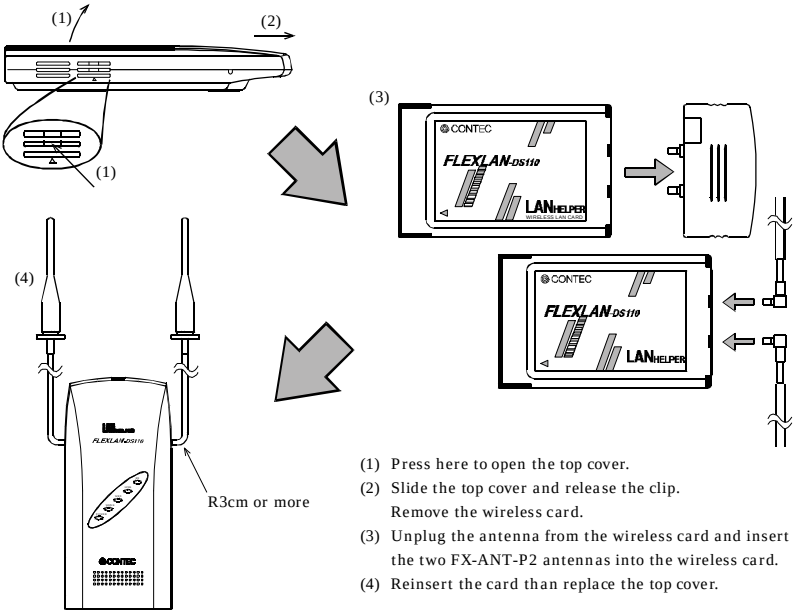


Figure 4.8. FX-ANT-P2 Connection

Note!

To prevent any adverse effect on the coaxial cable characteristics, ensure the cable bend radius is never less than 3cm.

5. Settings

Setup Procedures

Through Mode

Simple setup procedure (Only MODE switch and ID switch)

(1) Set the operation mode to Through Mode (Set MODE switch 7 to OFF)

(2) Select to Wireless of operating Modes (ADHOC, Infrastructure)

(3) Select to Baud rate of RS-232C (9,600bps, 19,200bps, 38,400bps, 115,200bps)

(4) Select the wireless channel (1, 6, or 11)

(5) Use the ID switch to set the device ID (Set the ID of the opposing device.)

(6) Restart

Advanced setting procedure (Using the utility software)

(1) Use “Connection Environment” to specify how to connect to the device on which to perform maintenance.

(2) Set MODE switch 8 to ON to select Terminal Mode.

(3) Create the device list by using “Node Registration” to perform an automatic search or by adding new device entries.

(4) Use “Configuration” to clear the “Enable MODE Switch” check box in the operating environment settings and set the operation mode to “Through Mode”.

(5) Set the settings you wish to change.

(6) Set the desired items.

(7) Use the [Reboot] button to reboot the device.

(8) Set MODE switch 8 to OFF.

* Once you have performed steps (1) and (3), you do not need to repeat them each time unless there have been some changes. When modifying settings on a device that has already been setup, you must first use the [Read] button to read the current settings.

Advanced setting procedure (Using modem commands from a terminal)

(1) Set MODE switch 8 to ON to select Terminal Mode.
The RS-232C settings are preset to 9,600bps, 8 data bits, no parity, 1 stop bit, and hardware flow control. Keyboard input is echoed back.

(2) Use the @RRG command to set REG003 to “ignore MODE switches” and REG005 to “Through Mode”.

(3) Use the @RRG command to modify the desired settings.

(4) When you have finished changing settings, use the @SAV command to save the settings.
Use the @RES command if you wish to apply the new settings temporarily without saving.

(5) Use the @RST command to reboot the unit.

(6) Set MODE switch 8 to OFF.
If wireless operation is set to ADHOC mode, the WLINK LED illuminates after the unit is rebooted if an opposing FX-DS110-COM device is detected. In Infrastructure mode, the WLINK LED illuminates when the device logs into the access point.

Note!

If connecting to an Ethernet network via an access point, set appropriate values for the IP address, subnet mask, and similar parameters to prevent any problems on other LAN devices.

Modem Mode

Simple setup procedure (Only MODE switch and ID switch)

(1) Set the operation mode to Modem Mode (Set MODE switch 7 to ON)

(2) Select to Wireless of operating Modes (ADHOC, Infrastructure)

(3) Select to Baud rate of RS-232C (9,600bps, 19,200bps, 38,400bps, 115,200bps)

(4) Select the wireless channel (1, 6, or 11)

(5) Use the ID switch to set the device ID (Set the ID of the opposing device.)

(6) Restart

Advanced setting procedure (Using the utility software)

(1) Use “Connection Environment” to specify how to connect to the device on which to perform maintenance.

(2) Set MODE switch 8 to ON to select Terminal Mode.

(3) Create the device list by using “Node Registration” to perform an automatic search or by adding new device entries.

(4) Use “Configuration” to clear the “Enable MODE Switch” check box in the operating environment settings and set the operation mode to “Modem Mode”.

(5) Set the settings you wish to change.

(6) Set the desired items.

(7) Use the [Reboot] button to reboot the device.

(8) Set MODE switch 8 to OFF.

* Once you have performed steps (1) and (3), you do not need to repeat them each time unless there have been some changes. When modifying settings on a device that has already been setup, you must first use the [Read] button to read the current settings.

Advanced setting procedure (Using modem commands from a terminal)

(1) Set MODE switch 8 to ON to select Terminal Mode.
The RS-232C settings are preset to 9,600bps, 8 data bits, no parity, 1 stop bit, and hardware flow control. Keyboard input is echoed back.

(2) Use the @RRG command to set REG003 to “ignore MODE switches” and REG005 to “Modem Mode”.

(3) Use the @RRG command to modify the desired settings.

(4) When you have finished changing settings, use the @SAV command to save the settings.
Use the @RES command if you wish to apply the new settings temporarily without saving.

(5) Use the @RST command to reboot the unit.

(6) Set MODE switch 8 to OFF.
If wireless operation is set to ADHOC mode, the WLINK LED illuminates after the unit is rebooted if another FX-DS110-COM device on the network is detected. In Infrastructure mode, the WLINK LED illuminates when the device logs into the access point.

Note!

If connecting to an Ethernet network via an access point, set appropriate values for the IP address, subnet mask, and similar parameters to prevent any problems on other LAN devices.

Virtual COM Mode

Advanced setting procedure (Using the utility software)

(1) Use “Connection Environment” to specify how to connect to the device on which to perform maintenance.

(2) Set MODE switch 8 to ON to select Terminal Mode.

(3) Create the device list by using “Node Registration” to perform an automatic search or by adding new device entries.

(4) Use “Configuration” to clear the “Enable MODE Switch” check box in the operating environment settings and set the operation mode to “Virtual COM Mode”.

(5) Set the settings you wish to change.

(6) Set the desired items.

(7) Use the [Reboot] button to reboot the device.

(8) Set MODE switch 8 to OFF.

* Once you have performed steps (1) and (3), you do not need to repeat them each time unless there have been some changes. When modifying settings on a device that has already been setup, you must first use the [Read] button to read the current settings.

Advanced setting procedure (Using modem commands from a terminal)

(1) Set MODE switch 8 to ON to select Terminal Mode.
The RS-232C settings are preset to 9,600bps, 8 data bits, no parity, 1 stop bit, and hardware flow control. Keyboard input is echoed back.

(2) Use the @RRG command to set REG003 to “ignore MODE switches” and REG005 to “Virtual COM Mode”.

(3) Use the @RRG command to modify the desired settings.

(4) When you have finished changing settings, use the @SAV command to save the settings.
Use the @RES command if you wish to apply the new settings temporarily without saving.

(5) Use the @RST command to reboot the unit.

(6) Set MODE switch 8 to OFF.
If wireless operation is set to ADHOC mode, the WLINK LED illuminates after the unit is rebooted if another FX-DS110-COM device on the network is detected. In Infrastructure mode, the WLINK LED illuminates when the device logs into the access point.

Note!

If connecting to an Ethernet network via an access point, set appropriate values for the IP address, subnet mask, and similar parameters to prevent any problems on other LAN devices.

Utility Software Settings

This is a Windows application for detecting devices on the network, reading and writing setup data, upgrading firmware, and displaying status information.
These maintenance operations can be performed from a Windows PC via either the LAN or COM port.

Preparation of Utility Software

(1) Insert the floppy disk (provided) in the A: drive of the computer.

(2) Open the Explorer.

(3) Use Explorer to copy the file 'XCOMUTIL.EXE' from the floppy disk to the appropriate directory.
`Example: C:\WLANUTIL\`

Starting of Utility Software

Double click on the XCOMUTIL.EXE file to open the Access Point Maintenance Utility.
You will see the following main menu.

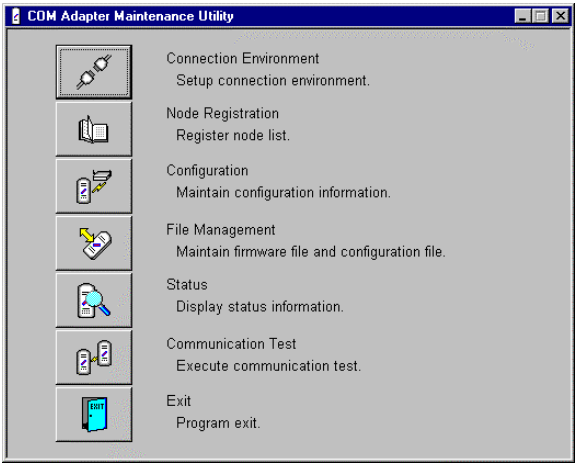


Figure 5.1. Main Menu

Connection environment

This sets up the utility software. These settings need to be set before you can perform maintenance operations.

Node registration

Edits the access point name list.
This list is used to detect devices connected by wired or wireless connection. Device names are added or deleted using the edit function.

Configuration

Maintains configuration information.
View or enter settings for the selected devices.

File management

Used for firmware maintenance.
View firmware version, or write firmware.

Status

Displays access point information.
View and verify information about the selected device.

Communication test

Performs a simple communications test.

Exit

Program exit.

Connection Environment

This specifies the setup data used by the utility software to perform device maintenance.
These settings are required to setup communications between the utility software and the network devices. You must set these settings before performing operations such as registering devices using an automatic search, setting up devices, upgrading firmware, or displaying status information.

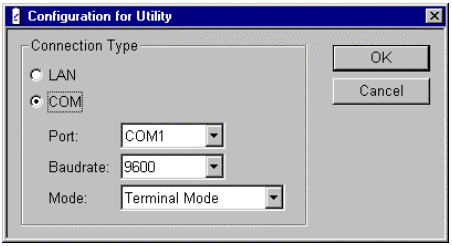


Figure 5.2. Connection Environment

Parameter	Description
LAN	Perform device maintenance via the LAN port.
COM	Perform device maintenance via the COM port.
Port	Select the COM port name on the Windows PC.
Baudrate	Set the communication speed.
Mode	Select the operating mode of the connected device.

Settings table for using the COM port

RP-COM(FIT)	Utility software		
	Mode		Baudrate
	Terminal Mode	Modem Mode	
Modem Mode	O	O	Set same value as set on device
Through Mode	O	×	Set values that permit communications on both sides
Virtual COM Mode	O	×	

O: allowed, ×: not allowed

Notes!

- *To use terminal mode, the ID switch on the device must be set to "F".*
- *When using modem mode, if the RS-232C settings (data bits, parity, and stop bits) on the device are different to those listed below, use terminal mode to modify the settings.*

Parameter	Setting value
Data bit	8 bit
Parity	None
Stop bit	1 bit
Flow control	Hardware

Node Registration

This registers data for the devices on the network. Maintenance operations such as changing settings or upgrading the firmware are performed based on the data registered here. You must always perform node registration.
Assigning names to the devices found by the automatic search makes it easier to identify the devices on the network.
Enter a name of up to 32 characters. A maximum of 255 devices can be registered.

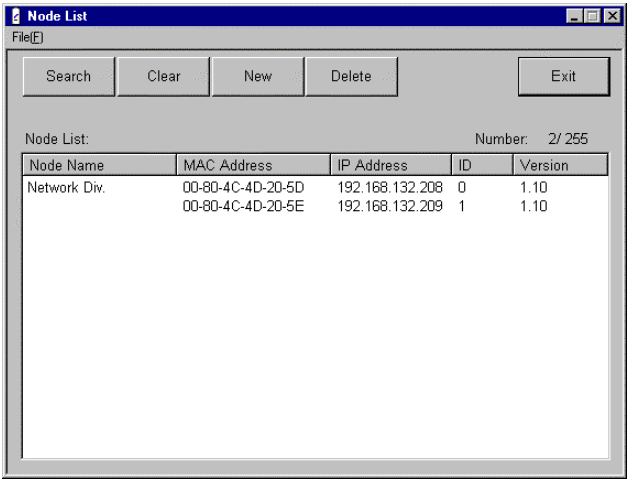


Figure 5.3. Node Registration

Button	Description
Search	This automatically detects and registers all devices connected to the same network group. If you also wish to manage devices located on the far side of an IP router, use the "New" button to register each device directly.
Clear	Deletes all registered data.
New	Registers data for a new device to be managed.
Delete	Deletes the data for the device selected in the node list
Exit	Returns to the main menu.

To modify the data displayed in the node list, double click on the node you wish to modify to open an edit window.
You can also use the "File" menu to save the current node list data to the hard disk or load a previously saved file.

Configuration

This reads and writes the settings for the device selected in the "Node Name" field.
You can set basic parameters such as the operating mode as well as SNMP and other detailed parameters.
To apply your changes, write the settings to the device and then reboot it.
You can also use the "File" menu to save the currently displayed settings to the hard disk or load a previously saved file.

Button	Description
Password	Change the password for the selected device. To change, enter the current password and new password. The new password does not become active until the device is rebooted. The password can be up to 6 alphanumeric characters and is case sensitive.
Read	Read the settings for the selected device.
Write	Write the currently displayed settings to the selected device. The new settings do not become active until the device is rebooted.
Default	Restore the factory default settings. To apply these settings, write the settings to the device and then reboot it.
Reboot	Reboot the selected device.
Exit	Returns to the main menu.

* Password input is required for the "Password", "Read", "Write", and "Reboot" commands.
The factory default setting is no password. In this case, you do not need to enter anything.

Base Configuration

This sets the IP parameters and other basic operating settings for the device. You must always set the IP parameters if installing the device in an existing network.

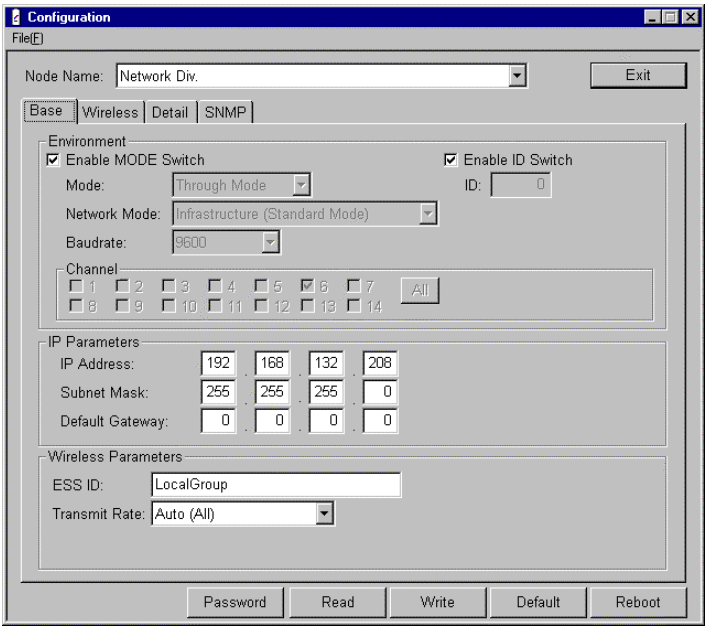


Figure 5.4. Base Configuration

Table 5.1. Base Configuration ***< 1 / 2 >***

Parameter	Memory register	Factory setting	Input range	Description
Enable MODE Switch	REG003	Enabled	Enabled/Disabled	Specifies whether to use the MODE switch setting. If disabled, the operation mode, network mode, baud rate, and wireless channel can be set from the utility software. * Always disable this setting if using the utility software to set Virtual COM Mode.
Mode	REG005	Switch	Through Mode / Modem Mode / Virtual COM Mode	Set the operating mode you wish to use.
Network Mode	REG045	Switch	ADHOC (Simple Mode)/ Infrastructure (Standard Mode)/ Infrastructure (Compatible Mode)	Set the wireless operation mode.
Baudrate	REG006	Switch	300/ 600/ 1,200/ 2,400/ 4,800/ 9,600/ 14,400/ 19,200/ 38,400/ 57,600/ 115,200/ 230,400/ 460,800/ 921,600	Set the communication speed of the RS-232C port. *These must match the settings for the device connected to the RS-232C port.
Channel	REG012	Switch	US: 1~11 EU: 1~13	Set the wireless channel number. The setting method differs depending on the operating mode. ADHOC : Only one can be set. Infrastructure Extended Roaming Disabled : Auto Extended Roaming Enabled : More than one can be set.

Table 5.1. Base Configuration < *2 / 2* >

<table>
<tr><th>Parameter</th><th>Memory register</th><th>Factory setting</th><th>Input range</th><th>Description</th></tr>
<tr><td>Enable ID Switch</td><td>REG001</td><td>Enabled</td><td>Enabled/Disabled</td><td>Specifies whether to use the ID switch setting.</td></tr>
<tr><td>ID</td><td>REG002</td><td>Switch</td><td>0~254</td><td>Set the ID number to identify the device.<table><tr><th>Mode</th><th>Setting value</th></tr><tr><td>Through</td><td>Set the same ID to each device pair</td></tr><tr><td>Modem</td><td>Different ID for each device</td></tr><tr><td>Virtual COM</td><td>Not used</td></tr></table></td></tr>
<tr><td>IP Address</td><td>REG071 ~REG074</td><td>10.x.x.x *1</td><td></td><td>Set the IP address mask assigned by the network administrator. *2</td></tr>
<tr><td>Subnet Mask</td><td>REG075 ~REG078</td><td>255.0.0.0</td><td></td><td>Set the subnet mask assigned by the network administrator. *2</td></tr>
<tr><td>Default Gateway</td><td>REG079 ~REG082</td><td>0.0.0.0</td><td></td><td>Set the IP address of the default gateway. *2</td></tr>
<tr><td>ESSID</td><td>REG013 ~REG044</td><td>"LocalGroup"</td><td>32 standard alphanumeric characters (case sensitive)</td><td>Set the name of the wireless LAN network. Communication cannot be performed between wireless devices with different names. Accordingly, changing this name divides from the network.</td></tr>
<tr><td>Transmit Rate</td><td>REG046</td><td>Auto (All)</td><td>1Mb/s / 2Mb/s / Auto(1Mb/s, 2Mb/s) / 5.5Mb/s / 11Mb/s / Auto(All)</td><td>Sets the communication speed for wireless transmission.</td></tr>
</table>

*1: Factory setting of IP Address

A unique value is assigned using the lower 3 bytes of the 6-byte Ethernet address.

ex.)Ethernet address → IP address

00-80-4C-01-02-03 → 10.1.2.3

00-80-4C-0D-0E-0F → 10.13.14.15

The initial '10' is common to all settings.

*2: When installing the device in an existing network or when connecting to an Ethernet network via an access point, set appropriate values for these parameters to prevent any problems on other LAN devices.

Wireless Configuration

Sets the wireless parameters for the device.

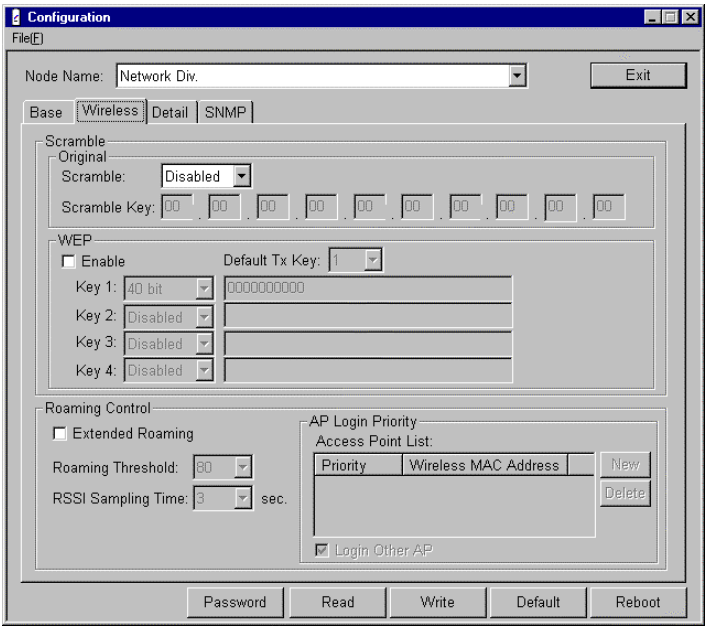


Figure 5.5. Wireless Configuration

Table 5.2. Wireless Configuration

Parameter	Memory register	Factory setting	Input range	Description
Scramble	REG048 REG047	Disabled	Disabled/ Type1/ Type2	Set a proprietary encryption procedure for wireless data. Typically, “Type 2” is specified when encryption is enabled. However, select “Type 1” if communicating with devices that do not support type 2. * You cannot communicate with devices that have a different encryption setting. Also note that, when “Type 1” is set, bridge data is padded to an even number.
Scramble Key	REG049 ~REG058	Set 0 to all	Hexadecimal value (0 to 9, A to F)	Set the key to use for wireless data encryption.
Enable(WEP)	REG059	Disabled	Enable/Disabled	Specify whether to use the WEP function.
Default Tx Key	REG060	1	1~4	Specify the WEP key number to use for data transmission.
Key1	REG144 ~REG157	Set 0 to all at 40bit	Hexadecimal value (0 to 9, A to F)	Specify the WEP key for WEP encryption. To perform communications using the WEP function, the key placed in the default send key number used for transmission must be the same as the key placed in the same location on the receiver.
Key2~4	REG161 ~REG208	Disabled	Hexadecimal value (0 to 9, A to F)	
Extended Roaming	REG108	Disabled	Enable/Disabled	Sets the AP roaming method. *1 If enabled, preferred APs to log into can be specified.
Roaming Threshold	REG111	Impossible (80)	50~150	Set the threshold value for initiating roaming. *2 Roaming is performed if the average RSSI value during the RSSI sampling time is less than this value.
RSSI Sampling Time	REG112	Impossible (3seconds)	1~10	Set the sampling time (seconds) for obtaining the RSSI value to use for initiating roaming. *2
AP Login Priority	REG113~ REG142	Cannot be set (no registration)		Set the preferred APs to log into. *2 Up to 5 APs can be specified. APs in lower numbered positions have higher priority.
Login Other AP	REG143	Impossible (log in)	Enable(log in)/ Disabled(do not log in)	Specify whether logging in to other than the specified APs is permitted. *2

*1: Only applicable when set as a station in infrastructure mode.

*2: Can only be set when enhanced roaming is enabled.

Detail Configuration

Set the various parameters required for communicating in each operation mode. As the parameters differ between operation modes, refer to the table below.

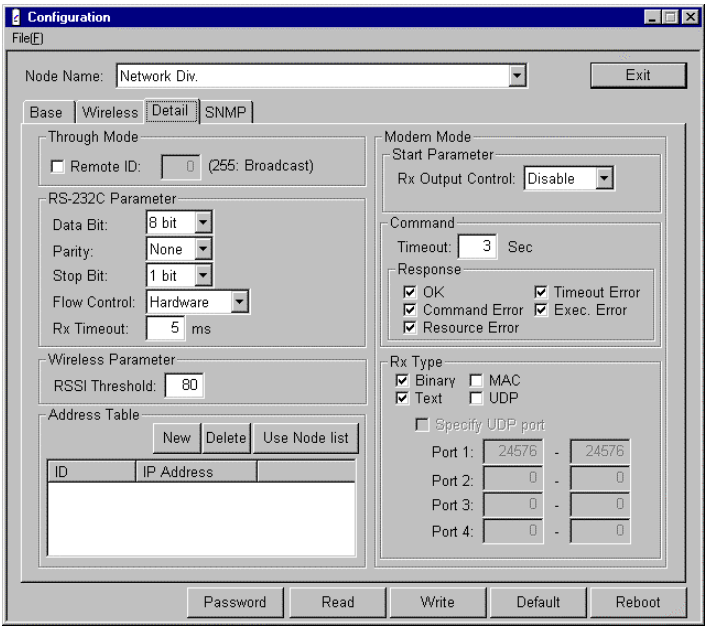


Figure 5.6. Detail Configuration

Table 5.3. Settings for each operating mode

Parameter	Memory register	Factory setting	Input range	Mode (1)	Mode (2)	Mode (3)	Description
Remote ID	REG084	None	0 to 255/ None	O	×	×	Set the ID of the opposing device with which you are communicating. Set "255" if sending to all devices in the same network group.
Data Bit	REG008	8 bit	8 bit/7 bit	O	O	O	Set the number of data bits for the RS-232C port communication data. *1
Parity	REG009	None	None/Odd/ Even	O	O	O	Set the parity of the RS-232C port communication data. *1
Stop Bit	REG010	1 bit	1 bit/ 2 bit	O	O	O	Set the number of stop bits for the RS-232C port communication data. *1
Flow control	REG007	Hardware	Hardware/ XON/XOFF/ None	O	O	O	Set the flow control method for the RS-232C port. *1
Rx Timeout	REG011	5msec	0 to 255	O	×	O	Set the inter-character timeout milliseconds) for characters output to the device. If the gap between characters is longer than the time set here, the data is sent via the network port.
RSSI Threshold	REG083	80	1 to 150	O	O	O	Set the reception level threshold for illuminating the RSSI LED.
Address Table	IP Table 000 to 254	0.0.0.0		O	O	×	Set the IP addresses corresponding to the device IDs. Set this table if using devices on the other side of a router or if using a predefined correspondence between device IDs and IP address. *2
Rx Output Control	REG089	Prohibition	Prohibition/ Permission	×	O	×	Specify whether to output received data to the terminal from immediately after booting.
Timeout	REG086	3sec	0 to 255	×	O	×	Set the timeout time (seconds) for modem commands. If the end of a command string is not received within this time, the command is discarded. However, commands are not discarded in terminal setup mode.
Response	REG087 to REG088	Response altogether	Response/ No response	×	O	×	Specify for each message whether or not to issue replies to modem commands. *3
Rx Type	REG090	Binary, Text	Binary/ Text/ MAC/ UDP	×	O	×	Specify the type of packets for which to output data received from the wired network to the terminal. *4 If UDP is specified, you can specify four ranges of port numbers that you wish to receive. If you wish to receive data from a specific port only rather than a range, just specify the same port number in both fields.

*1 These must match the settings for the device connected to the RS-232C port.

*2

Button	Description
New	Register a new table entry
Delete	Delete the selected table entry
Use Node list	Set the data entered using “Node Registeration”.

To change the displayed data, double click on the entry you wish to modify.

This opens an edit window.

*3 As the end of the command message differs depending on the command, refer to the “Modem Commands” section below.

*4 Response message

Response message	Character	Description
OK	“OK”	Successful completion
Command Error	“E1”	Invalid command or parameter
Resource Error	“E2”	Unable to execute command because of insufficient internal resources.
Timeout Error	“E3”	No response from opposing device for a command that expects a response (e.g. @PIG).
Exec.Error	“E4”	An error other than those listed above occurred during command processing.

*5 Receiving packet type

Rx Type	Receivable data	Character sequence
Binary	- Data sent by @TXB command - Data sent by through mode device	“@RXB”
Text	- Data sent by @TXT command	“@RXT”
MAC	- Data sent by @TXE command - Ethernet frame received from wired network.	“@RXE”
UDP	- Data sent by @TXU command - UDP frame received from wired network. (If a UDP port is specified, the data is from that port)	“@RXU”

Note: If both MAC and UDP are enabled, data identified as UDP data is treated accordingly and other data is treated as MAC data.

SNMP Configuration

Set these settings when using the SNMP agent function.

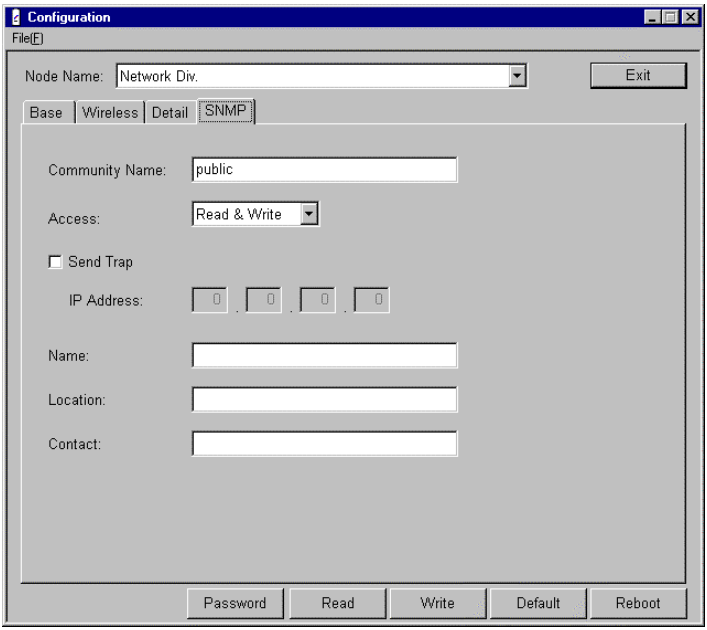


Figure 5.7. SNMP Configuration

Table 5.4. SNMP Configuration

Parameters	Factory settings	Input range	Description
Community Name	"public"	31 standard alphanumeric characters (case sensitive)	SNMP verification string. This acts like a password for access using SNMP. The SNMP administrator can use this name to access the device's MIB information.
Access	Read & Write	Read & Write / Read Only	Set access permissions for community name. Set whether "Read Only" or "Read & Write" is permitted.
Send Trap	Disabled	Enabled / Disabled	Specify whether to notify the SNMP administrator of MIB data access errors and startup (coldStart).
IP Address	With no setup		Set the IP address to which to send SNMP trap packets. Can only be set when "Send Trap" above is enabled.
Name	With no setup	A character string of up to 31 characters	Set the SNMP device name for the network device.
Location	With no setup	A character string of up to 31 characters	Set the physical location of the network device. For example, "Development Dept., 8th Floor"
Contact	With no setup	A character string of up to 31 characters	Set the administrator contact details for the network device. For example, set the network administrator's name and telephone number.

File Management

This dialog is used to get the current firmware version of devices on the network, perform firmware upgrades, and read or write the settings file.

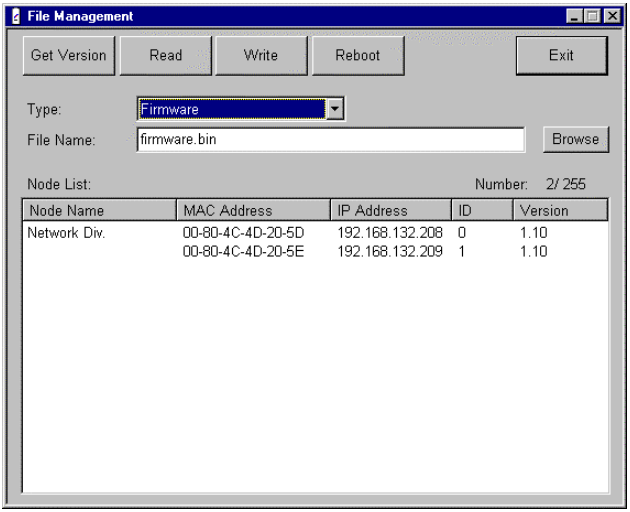


Figure 5.8. File Management

Button	Description
Get Version	Retrieves the version number from all devices connected to the same network group or from a specified device only. To get information from devices on the other side of a router, you need to specify the device explicitly. In this case, the device's IP address must have been set correctly.
Read	Read the firmware and settings file and save on the hard disk. *1
Write	Write the firmware and settings file from the hard disk to the selected device. *1
Reboot	Reboot the selected device. * You cannot perform a [Reboot] on a device in terminal setup mode. In this case, change the device ID switch back to its correct setting then turn the device power off then on again.
Exit	Returns to the main menu.
Browse	Select the file and directory name. Type: Firmware → Selected File: File Name Type: Configuration File → Selected File: Directory Name

*1: File name

The file name contains the lower 3 bytes of the MAC address of the selected device.

(ex.) 00-80-4C-4D-20-5E → 4D205E.TXT

Status

Reads operating information such as the environment settings and the send and receive counters from the device specified by “Node Name” and displays on the screen. The send and receive counters can also be cleared. However, data can only be cleared when scanning is stopped.

Table 5.5. Status

Button	Description
Exit	Returns to the main menu.
Scan Start	Reads data periodically (at the number of seconds specified by “Interval”). If “Interval” is “0”, data is read once only.
Stop	Stops reading data.

Environment

Displays the current operating environment for the specified device.

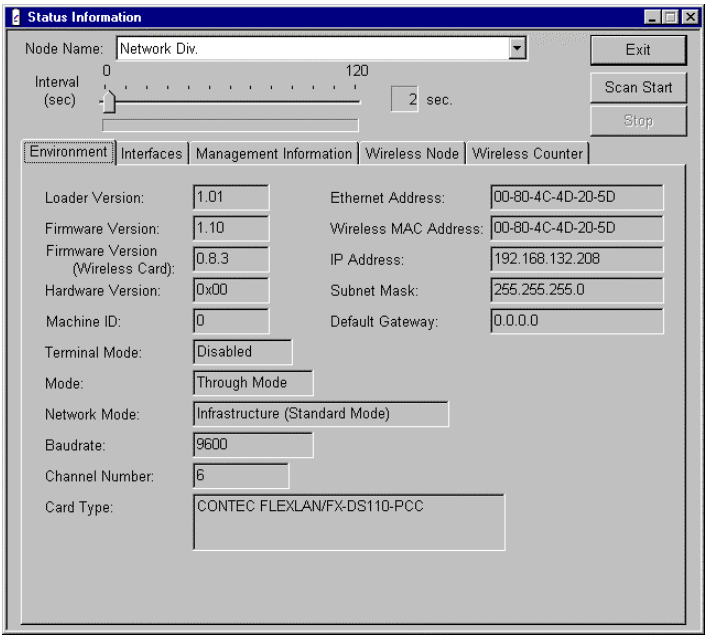


Figure 5.9. Status (Environment)

Parameters	Description
Loader Version	Version number of program for executing firmware.
Firmware Version	The version number of a firmware.
Firmware Version(Wireless Card)	Version number of wireless card firmware
Hardware Version	The version number of a hardware.
Machine ID	The device number set up now.
Terminal Mode	Current terminal mode status
Mode	Current operating mode
Network Mode	Current operating mode of Wireless
Baudrate	Current RS-232C port communication speed
Channel Number	Current wireless channel number
Card Type	Wireless card type
Ethernet Address	Ethernet address allocated to device.
Wireless MAC Address	Wireless MAC address assigned to device
IP Address	Current IP address set for device
Subnet Mask	The subnet mask set up now.
Default Gateway	The IP address of the default gateway set up now.

Interfaces

Displays data for the device's RS-232C and Ethernet interfaces including send and receive counters.
The counters can be cleared when scanning is stopped.

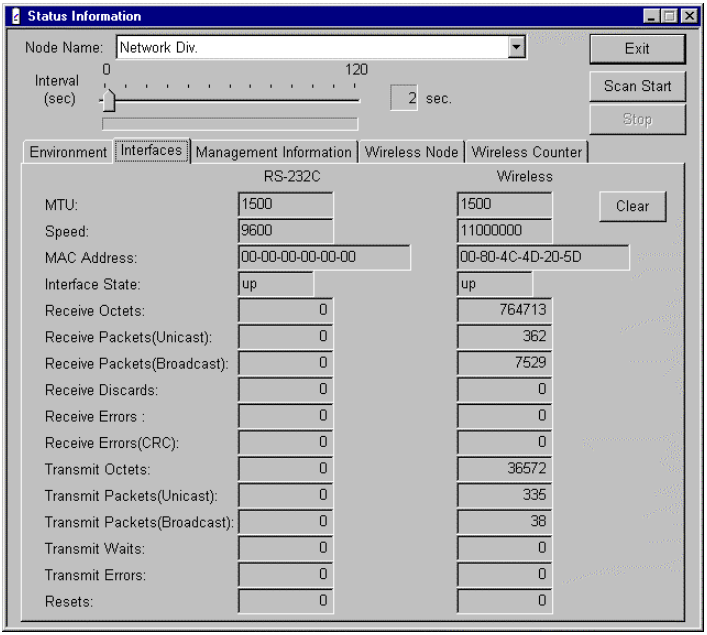


Figure 5.10. Status (Interfaces)

Parameter	Description
MTU	Maximum data size able to be sent by this interface
Speed	Transmission speed for sending data from this interface
MAC Address	MAC address assigned to this interface. No MAC address is set for the RS-232C interface.
Interface State	The state of an interface of operation. State: up — An interface is operating; down — Not operating or no link
Receive Octets	The number of bytes of the received data.
Receive Packets	The received number of packets
Receive Discards	The number which canceled the receiving packet by the shortage of a memory etc.
Receive Errors	The number of packets which the reception error generated.
Transmit Octets	The number of bytes of the transmitted data.
Transmit Packets	The transmitted number of packets.
Transmit Waits	The number of the packet which is carrying out waiting for transmission.
Transmit Errors	The number of packets which the transmitting error generated.
Resets	The number of times which reset this interface.

Management Information

Displays the counters for sending and receiving user data and the device's internal device ID vs. IP address table. The counters and the IP address list can be cleared when scanning is stopped.

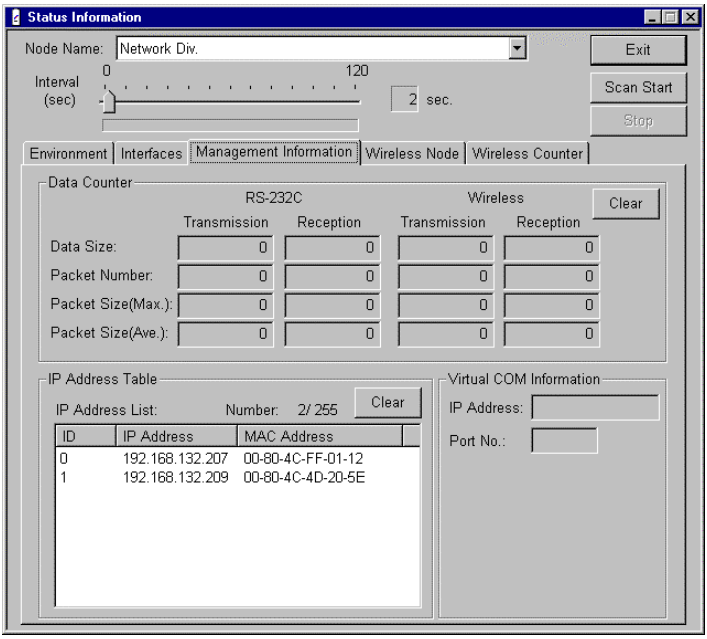


Figure 5.11. Status (Management Information)

<table>
<tr><th>Parameter</th><th>Description</th></tr>
<tr><td>Data Counter</td><td>Displays counters for data sent or received by user applications.
<table>
<tr><th>Mode</th><th>Data to count</th></tr>
<tr><td>Through</td><td>All data transmitted and received.</td></tr>
<tr><td>Modem</td><td>Send or receive data from data section of @TXB, @TXT, @TXE, @TXU, @RXB, @RXT, @RXE, or @RXU command.</td></tr>
<tr><td>Virtual COM</td><td>All data transmitted and received.</td></tr>
</table></td></tr>
<tr><td>Data Size</td><td>Total number of send or receive bytes.</td></tr>
<tr><td>Packet Number</td><td>Total number of send or receive packets.</td></tr>
<tr><td>Packet Size(Max.)</td><td>Largest send or receive packet size (bytes) up to this time</td></tr>
<tr><td>Packet Size(Ave.)</td><td>Average send or receive packet size (bytes) up to this time</td></tr>
<tr><td>IP Address Table</td><td>Displays the device ID vs. IP address table set in the “Configuration” screen’s “Address Table” and collected by the automatic learning function.
* If duplicate information exists, the first entry to be detected is used.</td></tr>
<tr><td>ID</td><td>Device ID obtained by learning function</td></tr>
<tr><td>IP Address</td><td>IP address of device with this device ID.</td></tr>
<tr><td>MAC Address</td><td>MAC address of device with this device ID.</td></tr>
<tr><td>Virtual COM Information</td><td>Displays data used by Virtual COM Mode.</td></tr>
<tr><td>IP Address</td><td>IP address of current host PC.
If the IP address is 0.0.0.0, this indicates there is no host PC.</td></tr>
<tr><td>Port No.</td><td>Port number of current host PC.</td></tr>
</table>

Wireless Node

Displays a list of logged in wireless devices and associated data such as link quality.
The wireless device list can also be cleared when scanning is stopped.

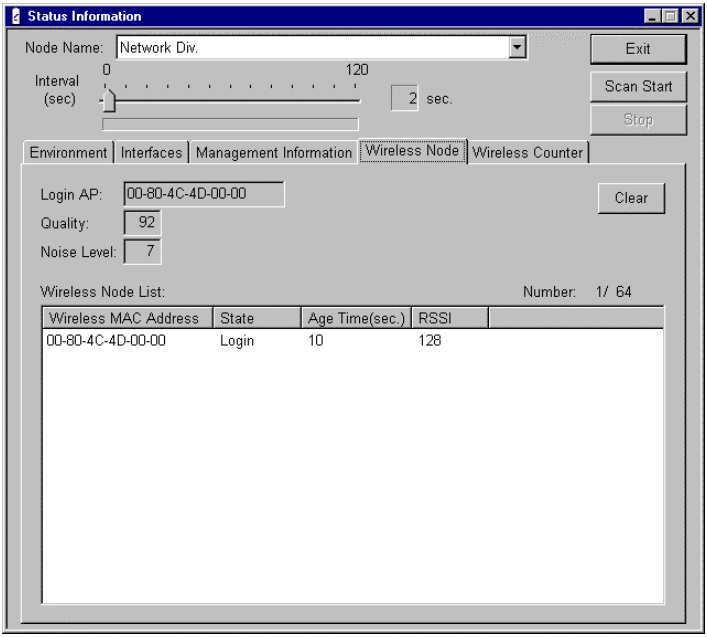


Figure 5.12. Status (Wireless Node)

Parameters		Description
Login AP		MAC address of currently logged-in AP *1
Quality		Quality of link to logged-in AP *1
Noise Level		Station-side noise level
Wireless Node List		- Infrastructure Information of logged-in AP. - ADHOC Information on devices located within radio range of this device.
	Wireless MAC Address	MAC address of wireless device
	State	Login status. Only applicable when infrastructure mode is set.
	Age Time	Length of time this device information has been stored (seconds) Saved when communication performed with device. Deleted when time reaches zero.
	RSSI	Reception level for device (maximum = 150) Higher values indicate higher reception sensitivity.

*1: Only applicable when infrastructure [unit type station] mode is set.

Wireless Counter

Displays the number of packets, errors, and similar for wireless communications. The counter values can be cleared when scanning is stopped.

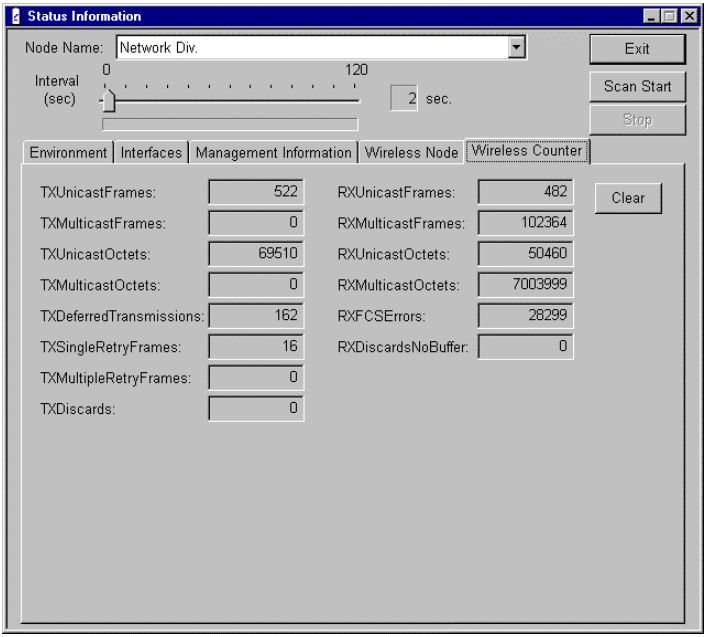


Figure 5.13. Status (Wireless Counter)

Parameters	Description
TXUnicastFrames	Number of packets sent by opposing station using unicast address
TXMulticastFrames	Number of packets sent by opposing station using multicast address
TXUnicastOctets	Number of data bytes sent by opposing station using unicast address
TXMulticastOctets	Number of data bytes sent by opposing station using multicast address
TXDeferredTransmissions	Number of packets for which a send delay occurred
TXSingleRetryFrames	Number of packets resent once only
TXMultipleRetryFrames	Number of packets resent two or more times
TXDiscards	Number of packets discarded
RXUnicastFrames	Number of packets received by opposing station using unicast address
RXMulticastFrames	Number of packets received by opposing station using multicast address
RXUnicastOctets	Number of data bytes received by opposing station using unicast address
RXMulticastOctets	Number of data bytes received by opposing station using multicast address
RXFCSErrors	Number of packets with FCS (Frame Check Sequence) errors
RXDiscardsNoBuffer	Number of packets with buffer errors

Communication Test

This performs a communication test between the device specified by “Node name” and the Windows PC connected to the device.

Echo back test

Performs an echo back test to the Windows PC connected to the FX-DS110-COM.
This test confirms whether the connections between the Windows PC and FX-DS110-COM, and between the two FX-DS110-COM units are working.

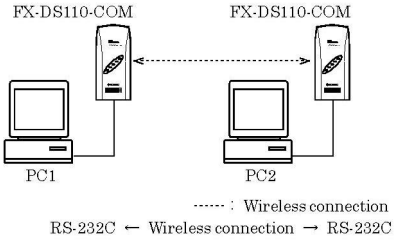


Figure 5.14. Echo Back Test (Example Configuration)

(Test procedure)

(1) Determine which PC is to send data (PC1) and which is to echo back the received data (PC2).

(2) Click the “Rx Wait” button on PC2 to wait for received data.

(3) Next, click the “Tx Start” button on PC1 to start sending data.

(4) PC2 echoes back to PC1 any data it receives via the FX-DS110-COM.

(5) PC1 checks whether the echoed back data is valid.

(6) PC1 increments the “In Packets” counter if the data is valid and increments the “In Errors” counter if an error occurs. If no response is received within a specified time, the “Timeout Errors” counter is incremented. In this case, you need to recheck the system configuration. Possible problems are an incorrect setup or the RS-232C cable not being connected correctly.

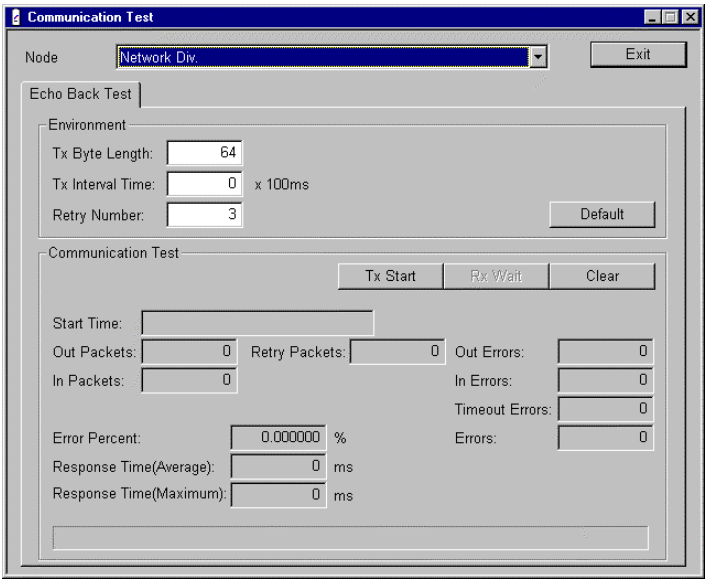


Figure 5.15. Echo Back Test

Button	Description
Exit	Returns to the main menu.
Default	Set the test parameters back to their default values.
Tx Start	Transmission of data is started.
Rx Wait	Receiving waiting of data is carried out.
Clear	Clear the counters and other displayed data.

Test environment

Parameter	Factory setting	Input range	Description
Tx Byte Length	64	64 to 1448	Set the number of bytes to send each time.
Tx Interval Time	0	0 to 65535	Set the time (unit = 100msec) between completing one send and receive operation and starting the next. If "0" is set, the next test starts immediately.
Retry Number	3	0 to 65535	If no response is received within a fixed time of data being sent, specify how many times to retry. If "0" is set, no retry is attempted.

Communication test

Parameter	Description
Start Time	Date and time when test started
Out Packets	Number of times data sent
In Packets	Number of times data received successfully
Retry Packets	Number of times data resent
Out Errors	Number of times a send error occurred
In Errors	Number of times a receive error occurred
Timeout Errors	Number of times echo back data not received within required time
Errors	Number of send errors, receive errors, and receive timeout errors.
Error Percent	Proportion of errors
Response Time (Average)	Average time from sending data until receiving echo back data (msec)
Response Time (Maximum)	Maximum time from sending data until receiving echo back data (msec)

Modem command

These commands are used to control the FX-DS110-COM. You can use these commands to send and receive data. The commands can be used in modem mode and in terminal mode. However, the binary data send and receive commands cannot be used in terminal mode.

Table 5.6. Command List

Command	Description
@RAR	Read all memory registers
@CAB	Clear send and receive buffers
@RBS	Read buffer status
@RRS	Read RSSI value
@INI	Initialize all memory registers and reset device
@RSD	Disable output of received data
@RSE	Enable output of received data
@CRB	Clear receive buffer
@RRG	Read and set memory registers
@RST	Reset
@CTB	Clear send buffer
@VER	Read firmware version
@TXT	Transmission of text data
@TXB	Transmission of binary data
@TXE	Transmission of binary data(Ethernet frames)
@TXU	Transmission of binary data(UDP/IP frames)
@RXT	Reception of text data
@RXB	Reception of binary data
@RXE	Reception of binary data(Ethernet frames)
@RXU	Reception of binary data(UDP/IP frames)
@RXN	Receive one packet of data
@PIG	Check whether opposing station is present (using IP address)
@ECO	Check whether opposing station is present (using device ID)
@SAV	Save settings in non-volatile memory
@RES	Update memory register values (without saving in non-volatile memory)
@RRT	Read and set device ID vs. IP address table

The following pages describe the function of each command.
The symbols used in the explanations have the following meanings.

=> : Indicates input from the terminal to the device
<= : Indicates output from the device to the terminal
CR : Indicates a carriage return (0x0D)
LF : Indicates a line feed (0x0A)

“ ” : Indicates the enclosed contents are ASCII characters. Not used in the actual data.

( ) : Indicates input of the enclosed data. Input is mandatory.

[ ] : Indicates input of the enclosed data. Data input can be omitted.

, : Used as a delimiter in the command format explanation. Not used in the actual data.

Numbers starting with “0x” :

Indicates binary data specified in hexadecimal format. The “0x” is not used in the actual data. For example, “0x05” means set “05”.

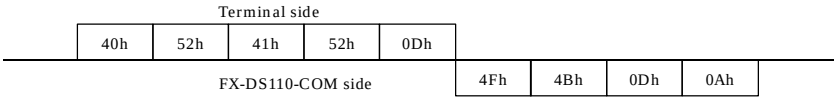
Example of a data set (wording of a telegram)

This section shows an example of the modem commands described later. The purpose is to show how the printed character string is actually sent over the RS-232C line.

(1) RAR command

- Example =>"@RAR" CR
  <="OK" CR LF

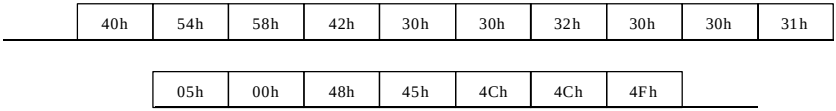
- Transmitted data



(2) TXB command

- Example =>"@TXB002001" ,0x05,0x00, "HELLO"

- Transmitted data



(1) @RAR

Operation Read the contents of all memory registers.

Format @RAR CR

Response A list of values
OK : Normal end

Example =>“@RAR” CR
Read the contents of all memory registers
<=“REG000:80H” CR LF
The register contents are output sequentially from register 000.
<=“REG001:00H” CR LF
Register values are output in hexadecimal.
-
-
-
<=“REG107:00H” CR LF
<=“OK” CR LF Normal end

(2) @CAB

Operation Clear all send and receive buffers.

Format @CAB CR

Response Nothing

Example =>“@CAB” CR Clear buffers.

(3) @RBS

Operation Read the status of internal buffers. The buffer statuses are represented by an 8-bit binary value.

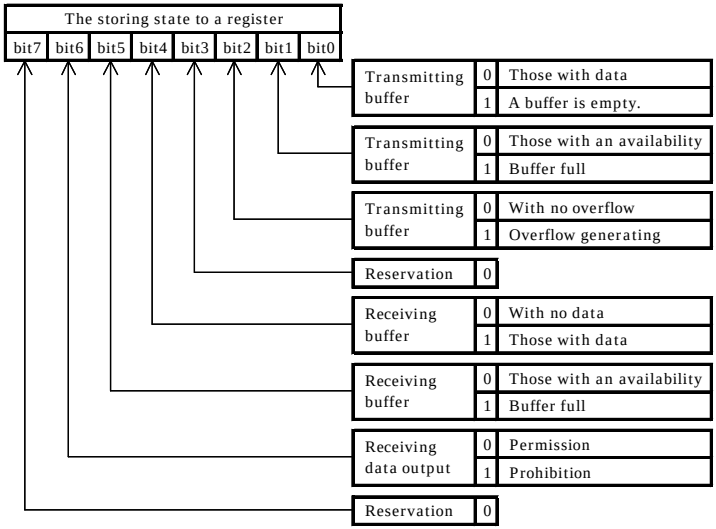


Figure 5.16. Buffer Status Representation

Format @RBS CR

Response XXXXXXXX(Status X: 0 or 1)

Example =>“@RBS” CR Read buffer status.
<=“00000001” CR LF Send buffer is empty.

(4) @RRS

Operation	Read RSSI value. In ADHOC mode, this returns the maximum RSSI value within the range that can be received by this device. In Infrastructure mode, this returns the RSSI value for the logged-in access point.	
Format	@RRS CR	
Response	XXX(0 ~ 150)	
Example	=>“@RRS” CR	Read RSSI value.
	<=“100” CR LF	RSSI value 100.

(5) @INI

Operation	Initialize all memory registers and reset the device.	
Format	@INI CR	
Response	OK : Normal end	
Example	=>“@INI” CR	Initialize all memory registers.
	<=“OK” CR LF	Normal end

(6) @RSD

Operation: Disable output of received data. The default setting is that the device starts with receive data output disabled (discard data mode). Issue the @RSE command to start receiving data. Also, issue the @RSD0 command if using the @RXN1 command (described below) to receive data one packet at a time.

Format: @RSD(Mode) CR
Mode = 0 : Collect data in receive buffer while output is disabled.
Mode = 1 : Discard received data while output is disabled.

Response: Nothing

Example: =>"@RSD0" CR — Disable output of received data.

(7) @RSE

Operation: Enable output of received data.
This starts outputting the data collected while data output was disabled.

Format: @RSE CR

Response: Nothing

Example: =>"@RSE" CR — Enable output of received data.

(8) @CRB

Operation: Clear any received data waiting to be output.

Format: @CRB CR

Response: Nothing

Example: =>"@CRB" CR — Clear any received data.

(9) @RRG

Operation: Read and/or set the value of the specified memory register. If "register number" only is specified, the current value is read. If ":setting value" is specified, the value is set in the specified register.

Format: @RRG(Register number<3 Beams>)[: Setting value< four-digit hexadecimal number >] CR

Response:
XXH : Register contents
OK : Normal end
E1 : Command error

Example:

=>"@RRG002" CR	Read the contents of register REG002.
<="00H" CR LF	Outputs the memory register value (00h).
=>"@RRG002:01" CR	Set the value of REG002 to 01h.
<="OK" CR LF	Normal end

(10) @RST

Operation: Reset the device.
Used to apply new settings after saving.

Format: @RST CR

Response: OK : Normal end

Example:

=>"@RST" CR	Reboot the device.
<="OK" CR LF	Normal end

(11) @CTB

Operation: Clear any data waiting to be sent.

Format: @CTB CR

Response: Nothing

Example:

=>"@CTB" CR	Clear send data.

(12) @VER

Operation Read device version number.

Format @VER CR

Response Loader version, Firmware version
OK : Normal end

Example =>“@VER” CR Read version number.
<=“Loader : 1.00” CR LF
A loader version is 1.00.
<=“Firmware: 1.00” CR LF
A firmware version is 1.00.
The firmware version of the wireless card is 0.8.3.
<=“OK” CR LF Normal end

(13) @TXT

Operation Send text data to specified device.
The destination device ID can be in the range 0 to 255, where 255 specifies broadcasting.
The sender device ID can be in the range 0 to 255, where 255 causes the device ID of this device to be set automatically.
The maximum length of data is 1448 bytes. The end of the data is indicated by a CR (carriage return).

Format @TXT(Destination device ID<3 Beams >)(Sender device ID<3 Beams >)(Text data) CR

Response Nothing

Example =>“@TXT002001”, “HELLO” CR
Send the 5 characters “HELLO” to device ID 002.

(14) @TXB

Operation Send binary data to specified device.
The destination device ID can be in the range 0 to 255, where 255 specifies broadcasting.
The sender device ID can be in the range 0 to 255, where 255 causes the device ID of this device to be set automatically.
The maximum length of data is 1448 bytes and the data format is 16-bit, Little Endian.

Format @TXB(Destination device ID<3 Beams >)(Sender device ID<3 Beams >)(Send data length)(Data) CR

Response Nothing

Example =>“@TXB002001”, 0x05, 0x00, “HELLO”
Send the 5 characters “HELLO” to device ID 002.
When sending 256 bytes of data, specify the send size as 0x00, 0x01

(15) @TXE

Operation Send the input data over the Wireless as Ethernet data.
The maximum length of data is 1514 bytes and the data format is 16-bit, Little Endian.
The data includes the Ethernet header.

Format @TXE(Send data length)(Data)

Response Nothing

Example =>“@TXE”, 0x13, 0x00, Send data length
Data
Ethernet header
0x00, 0x80, 0x4C, 0x00, 0x,00, 0x02,
Address
0x00, 0x80, 0x4C, 0x00, 0x,00, 0x01,
Transmitting agency address
0x08, 0x00, Type field
0xAA, 0x55, 0xAA, 0x55, 0xFF
Data
Send 19 bytes of data

(16) @TXU

Operation: Add a UDP/IP header to the input data and send over the Wireless.
This can be used to communicate with PCs or other devices that support the UDP/IP protocol.
Specify the port number as a 16-bit Little Endian value.
The maximum length of data is 1472 bytes and the data format is 16-bit, Little Endian.

Format: @TXU(IP address)(Address port number)(Transmitting agency port number)(Send data length)(Data)

Response: Nothing

Example:

=>"@TXU", 0xC0, 0xA8, 0x84, 0x01,
IP address
0x00, 0x10, Address port number
0x01, 0x10, Transmitting agency port number
0x05, 0x00, Send data length
0xAA, 0x55, 0xAA, 0x55, 0xFF
Data

Send 5 bytes of data to port 1000h on the device with IP address 192.168.132.1.

(17) @RXT

Operation — Output text data received from the Wireless.
The received data is only output if text reception is enabled in memory register (REG090). The destination device ID can be in the range 0 to 255, where 255 specifies broadcasting. The sender device ID can be in the range 0 to 254.
The maximum length of data is 1448 bytes. The end of the data is indicated by a CR (carriage return).

Format — @RXT(Destination device ID<3 Beams >)(Sender device ID<3 Beams >)(Text data) CR

Example — <=“@RXT002001”, “HELLO” CR
Received the text “HELLO” (5 characters) sent from device ID 001 to 002.

(18) @RXB

Operation — Output binary data received from the Wireless.
The received data is only output if binary reception is enabled in memory register (REG090).
The destination device ID can be in the range 0 to 255, where 255 specifies broadcasting.
The sender device ID can be in the range 0 to 254.
The maximum length of data is 1448 bytes and the data format is 16-bit, Little Endian.

Format — @RXB(Destination device ID ID<3 Beams >)(Sender device ID<3 Beams >)(Receive data length)(Data)

Example — <=“@RXB002001”, 0x05, 0x00, “HELLO”
Received the text “HELLO” (5 characters) sent from device ID 001 to 002.

(19) @RXE

Operation
Output Ethernet data received from the Wireless.
The received data is only output if MAC reception is enabled in memory register (REG090).
The maximum length of data is 1514 bytes and the data format is 16-bit, Little Endian.
The start of the data contains the Ethernet header.

Format
@RXE(Receive data length)(Data)

Example
<="@RXE", 0x13, 0x00, Receive data length
Data
Ethernet header
0x00, 0x80, 0x4C, 0x00, 0x,00, 0x02, Address
0x00, 0x80, 0x4C, 0x00, 0x,00, 0x01, Transmitting agency address
0x08, 0x00, Type field
0xAA, 0x55, 0xAA, 0x55, 0xFF Data
Receive 19 bytes of data

(20) @RXU

Operation
Output UDP/IP data received from the Wireless.
The received data is only output if UDP reception is enabled in memory register (REG090). If a UDP port is specified, only data received from that port is output.
Specify the port number as a 16-bit Little Endian value.
The maximum length of data is 1472 bytes and the data format is 16-bit, Little Endian.

Format
@RXU(Destination IP Address)(Sender IP Address)(Destination port number)(Sender port number)(Receive data length)(Data)

Example
<="@RXU", 0xC0, 0xA8, 0x84, 0x01,
IP address
0xC0, 0xA8, 0x84, 0x02,
Sender IP Address
0x00, 0x10, Destination port number
0x01, 0x10, Sender port number
0x05, 0x00, Receive data length
0xAA, 0x55, 0xAA, 0x55, 0xFF
Data

Received data sent from the device with IP address 192.168.132.2 to port 1000h on the device with IP address 192.168.132.1.

(21) @RXN

Operation

Receive one packet of data.
If using the @RXN1 command to receive packets one at a time, first use the @RSD0 command to disable output of received data and change to the mode whereby data is collected in the receive buffer.

Issuing the @RXN1 command outputs any received data already in the buffer. If no data is waiting, data is output when it is received. After receiving data, issue the @RXN1 command again to received the next data packet.
While waiting to receive data after issuing a @RXN1 command, you can issue @RXN0 to cancel data reception. Changing to terminal setup mode, or issuing the @CAB or @CRB command also cancels data reception.

Format

@RXN(Mode) CR
Mode = 0 : Cancel waiting for data reception
Mode = 1 : Receive one packet of data

Example

=>"@RSD0" CR Disable output of received data.
=>"@RXN1" CR Get received data.
<="@RXB002001", 0x05, 0x00, "HELLO"
Received the data "HELLO" (5 characters) sent from device ID 001 to 002.

(22) @PIG

Operation Executes a Ping command for the device with the specified IP address.

Format @PIG(IP address) CR

Response
OK : Normal end
E1 : Command error
E2 : Insufficient resources
E3 : Timeout error
E4 : Transmitting error

Example =>“@PIG192.168.132.1” CR
Execute a Ping command for the device with IP address 192.168.132.1.
<=“OK” CR LF Normal end

(23) @ECO

Operation Executes a Ping command for the device with the specified device ID.

Format @ECO(Destination device ID) CR

Response
OK : Normal end
E1 : Command error
E2 : Insufficient resources
E3 : Timeout error
E4 : Transmitting error

Example =>“@ECO001” CR
Execute a Ping command for the device with device ID 001.
<=“OK” CR LF Normal end

(24) @SAV

Operation Save the current contents of the memory registers to non-volatile memory.

Format @SAV CR

Response OK : Normal end
E4 : Write-in error

Example =>“@SAV” CR Save to non-volatile memory
<=“OK” CR LF Normal end

(25) @RES

Operation Enable the values of the registers indicated by a “*” next to the register number in the register list.

Format @RES CR

Response OK : Normal end
E4 : Initialization error

Example =>“@RES” CR Enable settings
<=“OK” CR LF Normal end

(26) @RRT

Operation Reads and/or sets the table that defines the correspondence between device ID and IP address. This is required if you wish to communicate with devices on the other side of an IP router.
Also, even if the IP address for a device ID is not registered, the IP address is obtained automatically by the learning function if communication with the device occurs. These learnt values can also be referenced.

Format @RRT(Device ID) CR

Response OK : Normal end
E1 : Command error

Example =>“@RRT001” CR
Read the IP address for device ID 001.
<=“192.168.132.1” CR LF
The IP address is 192.168.132.1.
(“0.0.0.0” is output if no IP address is registered.)

Setup of a virtual COM driver

Correspondence OS

The virtual COM driver can be used on Windows 98, Windows 98 Second Edition, and Windows Millennium Edition.

Cautions on Use

Take note of the following points when using the virtual COM driver:

The virtual COM driver uses the F&eIT protocol.

The TCP/IP protocol must be installed as part of the network configuration.

The FX-DS110-COM must already be running before you start the application that is to use the virtual COM port.

Communications may not work correctly in some cases, depending on the application that is to use the virtual COM port and the device connected to the COM port on the FX-DS110-COM

Install

Installation procedure

(1) Select [Add New Hardware] from [Control Panel].

(2) This starts the [Add New Hardware Wizard]. Click [Next>] as instructed on the screen.

(3) In response to [Do you want Windows to search for your new hardware?], select [No, I want to select the hardware from a list.].

(4) In the [Hardware Types] screen, select [Ports(COM&LPT)].

(5) In the [Select the manufacturer and model of your hardware] screen, insert the floppy disk into the drive and select [Have Disk...].

(6) In the [Install From Disk] screen, specify the drive and directory of the floppy disk in the [Copy manufacturer's file from] field.

Ex.: [A:\]

(7) In the [Models] screen, select the [F&eIT Virtual COM Port (COMx)] option corresponding to the COM port number you wish to install.

Note!

Ensure that the settings do not conflict with an existing COM device or the port number of a different port.

Setup

(1) Select [Device Manager] from [System Properties].

(2) Double click on [Ports(COM&LPT)] and select [Properties] for the virtual COM device you wish to setup.

(3) Select [Port Settings] from [F&eIT Virtual COM Port (COMx) Properties].

(4) Set the required settings, then click [OK].

Notes!

- *Always set an IP address*
- *Set the IP address of the target FX-DS110-COM in the [Port Settings] IP address field*

Uninstallation procedure

(1) Select [Device Manager] from [System Properties].

(2) Double click on [Ports(COM&LPT)] and select [Remove] for the virtual COM device you wish to uninstall.

6. SNMP Agent Functions

This chapter describes the SNMP functions of this product, and explains how they can be built in using the SNMP Manager SNMPc by CONTEC.

SNMPc Overview

SNMPc is network control software for SNMP that runs on Windows and controls all network devices that have SNMP agent functions. SNMPc can be used to perform the following control functions.

- Monitoring unit startup status
- Monitoring port operating status
- Indicating MIB information
- Displaying log files of traps, events, etc.

For instructions on installing and operating SNMPc, refer to the SNMPc documentation. Note that a bitmap display of this product can be displayed on SNMPc by installing it from the floppy disk provided with this product.

MIB Support

This product provides MIB support for MIB-II (RFC1213), bridge MIB (RFC1493), and private MIB. Support is provided for the following group names.

Table 6.1. Group Names

MIB Group name	Description
MIB-II	
system	Information related to Device, including Device control name, operating time etc.
interfaces	Basic information related to the physical interface layer, including MAC address etc.
at	Information corresponding to the ARP cache
ip	Information related to IP protocol, including IP address information etc.
icmp	Information related to ICMP protocol, including ICMP message TX/RX count, etc.
udp	Information related to UDP protocol, including UDP message TX/RX count, etc.
snmp	Information related to SNMP, including SNMP message count, etc.
Private MIB	
wlescomEnvironment	Operating environment information.
wlescomStatusInfo	Status information including LED, DIP switch status.
wlescomPriSerInterfaces	Information related to RS-232C side interface.
wlescomPriSerDataCntTable	Counter table information of User data
wlescomPriSerAddrTable	Exchange table information of Device ID and IP Address
wlescomPriWLInterfaces	Information related to wireless side interfaces.
wlescomPriWLLoginApInfo	Information related to controlling AP.
wlescomPriWLNodeInfo	Wireless Device information.

Control Using SNMPc

Install SNMPc on a personal computer in the network to which this product is connected. Read the SNMPc manual carefully.

Once installation is complete, you can operate the PC on which SNMPc is installed as a network manager, analyzing network status and error information from this device as shown below.

Also, you can install the maintenance tools provided with this product on SNMPc, to display information about this product in graphic form as shown below.

Note!

In order to control this product, its IP address and community name must be entered accurately in the Settings

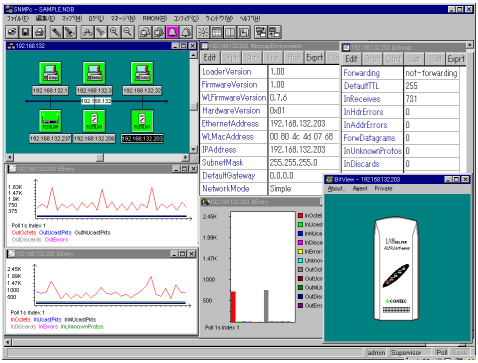


Figure 6.1. Settings

Building-in to SNMPc

Follow these steps to install SNMPc Ver. 4.

(1) Start the SNMPc Setup program.
To start SNMPc Ver. 4, select [Start] - [SNMPc 4.0] - [Setup].
After startup, verify the user registration information.

(2) Insert the Maintenance Tools floppy disk provided with this product into the floppy disk drive. Enter the floppy disk drive path name followed by SNMPc.4\, and click 'OK.'

Example: If the floppy disk drive is the A: drive, enter A:\SNMPc.4\.

(3) Select [CONTEC FX-DS110-COM], and click [OK] to start installation.

(4) When the following message appears, click [No] to exit the program.

[Do you want to install additional vendors?]

MIB Database Updates

After installing a new vendor, you will have to update the MIB database the next time SNMPc is started.

Follow these steps to update the MIB database. In this description we use 'SNMPc Ver.4' as an example.

(1) Start SNMPc.
To start SNMPc Ver. 4, select [Start] - [SNMPc 4.0] - [SNMPc].

(2) Click [Yes] to update the MIB database.

(3) When you are finished updating the MIB database, click [OK]. The build-in to SNMPc is not complete.

7. Troubleshooting

This chapter describes common problems that may occur with this product and what to do about them. If any problems occur that are not described here, check to confirm that the re-occur, then contact the store where you purchased the product, or the CONTEC information center.

When Communication Fails

Check hardware

- Check that the LAN cables are connected correctly.
- Check that the RS-232C cables are connected correctly.

Check software

- Is the MODE switch set correctly?
- Is the baud rate set correctly?
- Is the ID number set correctly?
- Check that the operating mode setting has been correctly entered.
- Check that the channel setting has been correctly entered.
- Is data encryption set correctly?
- Check that the IP address and subnet settings have been entered.
- Are there any obstacles (concrete or metal walls) that would significantly attenuate the radio waves?
- Are there any interfering radio signals in the area (devices such as microwave ovens that use the 2.4GHz band)?
- Check that the communication speed setting has been correctly entered.

Check the peripheral environment and place of installation

- A nearby source of electromagnetic interference can prevent communication. In general locations (excluding factories) the following may be sources of electromagnetic emissions.
  - 2.4GHz band wireless networks not compatible with IEEE 802.11b.
  - Microwave ovens
  - Security gates
  - Copiers
  - Elevator motors

Most electromagnetic sources other than wireless networks are local and not continuous, and therefore by moving the location of the unit and waiting briefly, communication may be possible.
Also, do not place wireless devices too close together. A distance of at least 1m should be allowed.

- Sometimes communication is hindered by attenuation of electric waves. Attenuation occurs naturally as distance from the source of transmission increases, but may also be caused by objects in the path of the transmission. The objects primarily responsible for attenuation are the following.
  - Concrete walls
  - Metallic surfaces around antennas

Stable transmission at 11Mbps requires an RSSI value of at least 80. The RSSI value can be verified on the Wireless Device Information tab on the Status screen using the utility software.

When SNMP Connections Fail

- It is possible that the device cannot locate a control parameter, or that a private MIB has not been compiled. See Chapter 7.
- If MIB settings have not been made, the correct community name may not have been entered. Be sure the community name setting agrees with the network manager's setting.
- Check the SNMP settings that are being used.

When the COM Will Not Start

Check the power LED

- Be sure the power LED is on. If it is not on, check the AC adapter, be sure it is correctly plugged into an outlet, and that the power supply type agrees with the power supply switch setting.
- Check whether the power LED is flashing. If the power LED is still flashing more than 3 minutes after the power is switched on, the problem may be an COM firmware failure. Use the utility software to upgrade the firmware version.

8. Appendix

Product Specifications

Table 8.1. Physical Specifications

Specification		FX-DS110-COM
Wired LAN unit	Ethernet standard	EIA-232-F
	Data transmission speed	300 to 921.6kbps
	Access method	CSMA/CD
Wireless LAN unit	Transmission format	IEEE 802.11b standard DS spectrum diffusion
	Data transmission speed	11, 5.5, 2, 1Mbps(fixed/automatic)
	Access method	CSMA/CA + ACK(RTS/CTS)
	Transmission packet	IEEE 802.11b frame
	Wireless category	ISM Baud 2400~2483.5 MHz
	Aerial power	10mW/MHz or less
	Security	Proprietary scramble/WEP
Antenna		Flat surface diversity antenna
Operating modes		ADHOC, Infrastructure
Dimensions (mm)		81(W) x 26.5(D) x 175(H)
Weight		0.2kg

Table 8.2. Software Specifications

Specification	FX-DS110-COM
Protocols	IP(RFC 791), ICMP(RFC 792), UDP(RFC 768), ARP(RFC 826), SNMP(RFC 1157), MIB II(RFC 1213)

Table 8.3. Installation Environment Conditions (Environment Specifications)

Specification	FX-DS110-COM
Supply voltage	5.5 to 7.0VDC (using AC adapter)
Current consumption	0.6A(Max.)
Operating temperature	0 to 50°C(main unit) 0 to 40°C(AC adapter)
Operating humidity	10 to 90%RH (without condensation)
Airborne dust	Not extreme
Corrosive gases	None
Other	Do not obstruct ventilation slits Leave 5cm open space in all directions

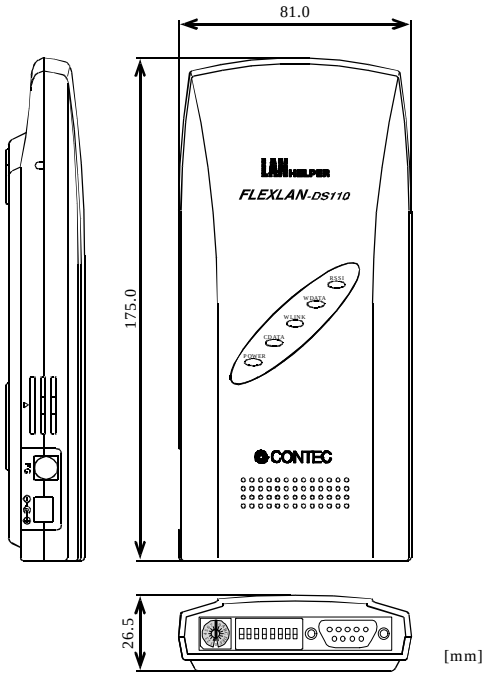


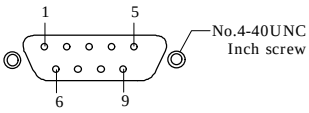
Figure 8.1. External Dimensions

Input/Output Interface

RS-232C Port Pin Assignments

Table 8.4. RS-232C Port Pin Assignments

Connector	D-SUB 9 pin (Male)



Pin No.	Abbreviated name	Signal	Input-Output	Note
1	DCD	Carrier detect	Input	not used
2	RXD	Received data	Input	
3	TXD	Transmitted data	Output	
4	DTR	Dataterminal ready	Output	
5	SG	Signal ground	---	
6	DSR	Dataset ready	Input	
7	RTS	Request to send	Output	
8	CTS	Clear to send	Input	
9	RI	Ring indicator	Input	not used

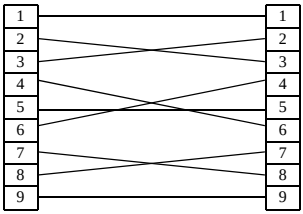


Figure 8.2. Wiring Diagram for Supplied RS-232C Cable

Memory register

The memory registers are used to store the operating mode and communication parameter settings for the device. These registers can be used in modem mode and terminal mode. An "*" next to the register number indicates registers that require settings to be reinitialized either using the @RES command or by saving the settings then rebooting.

Table 8.5. Memory Register List ***< 1 / 3 >***

Register number	Function	Access	Initial value	Supplement
REG000	MODE SW	R	MODE SW	MODE SW setting
*REG001	ID SW setting	R/W	ID SW enabled	0: ID SW enabled 1: ID SW disabled
*REG002	Device ID	R/W	ID SW	0 to 254
*REG003	MODE SW setting	R/W	MODE SW enabled	SW setting is enabled or disabled (excludes initialization) 0: MODE SW enabled 1: MODE SW disabled
REG004	Terminal setting mode	R/W	MODE SW setting	0: Disabled 1: Terminal setting mode
*REG005	Mode	R/W	MODE SW setting	0: Through mode 1: Modem mode 2: Virtual COM mode
*REG006	Baudrate	R/W	MODE SW setting	0: 300 1: 600 2: 1,200 3: 2,400 4: 4,800 5: 9,600 6: 14,400 7: 19,200 8: 38,400 9: 57,600 10: 115,200 11: 230,400 12: 460,800 13: 921,600
*REG007	Flow control	R/W	Hardware control	0: Hardware control (RTS/CTS) 1: None 2: Hardware control (XON/XOFF)
*REG008	Data bit	R/W	8bit	0: 8bit 1: 7bit
*REG009	Parity	R/W	None	0: None 1: Odd parity 2: Evevn parity
*REG010	Stop bit	R/W	1bit	0: 1bit 1: 2bit
REG011	Rx timeout	R/W	5msec	0 to 255
*REG012	Wireless Channel	R/W	MODE SW setting	US: 1 ~ 11 EU: 1 ~ 13
*REG013 and above	ESSID	R/W	Local Group	ESSID, max. 32 characters, delimittter = 0
*REG045	Network Mode	R/W	MODE SW setting	0: ADHOC(Simple Mode) 1: Infrastructure(Standard Mode) 2: Infrastructure(Compatible Mode)
*REG046	Wireless transmission speed	R/W	Auto	0: 1Mbps 1: 2Mbps 2: 1Mbps/2Mbps Auto 3: 5.5Mbps 4: 11Mbps 5: Auto
*REG047	Encryption type	R/W	Type1	0: Type1 1: Type2
*REG048	Encryption	R/W	Disable	0: Disable 1: Enable
*REG049 and above	Encryption Key	R/W	0	10 byte

Table 8.5. Memory Register List *< 2 / 3 >*

Register number	Function	Access	Initial value	Supplement
*REG059	WEP	R/W	Disable	0: Disable 1: Enable
*REG060	RSS threshold	R/W	1	1 to 4
REG065 and above	MAC address	R	00.80.4C. ****.**	Device-specific data (Cannot be modified)
*REG071 and above	IP address	R/W	10.**.**.**	Initial values are generated automatically from the MAC address.
*REG075 and above	Subnet mask	R/W	255.0.0.0	
*REG079 and above	Default gateway	R/W	0.0.0.0	
*REG083		R/W	80	
*REG084	Opposing station setting	R/W	Same device ID	0: Connect to device with same device ID. 1: Connect to device with specified device ID. Enable through mode only
*REG085	Device ID of opposing station	R/W	0	0 to 255 Enable through mode only (255: Broadcasting)
REG086	Command input timeout	R/W	3sec	Inter-character monitor time
REG087	Response OK ("OK")	R/W	Response	0: No response 1: Response
REG088	Response error ("E?")	R/W	Response altogether	11111111B E1 to E8
*REG089	Start with receive data output enabled	R/W	Output prohibition	0: Output prohibition 1: Output permission
REG090	Reception type	R/W	00000011B	0bit: Binary 1bit: Text 2bit: MAC 3bit: UDP Initial value = "Do not receive MAC or UDP"
REG091	UDP port setting	R/W	Disabled	0: Disabled 1: Enabled Only applies when UDP is set as the type of data to receive.
REG092 and above	Minimum value of UDP port 1	R/W	6000h	0: With no setup
REG094 and above	Maximum value of UDP port 1	R/W	6000h	Note that 5000h to 500Fh are reserved and cannot be used. If specifying the UDP number during operation, change the reception type to "do not receive UDP".
REG096 and above	Minimum value of UDP port 2	R/W	0000h	
REG098 and above	Maximum value of UDP port 2	R/W	0000h	
REG100 and above	Minimum value of UDP port 3	R/W	0000h	
REG102 and above	Maximum value of UDP port 3	R/W	0000h	
REG104 and above	Minimum value of UDP port 4	R/W	0000h	
REG106 and above	Maximum value of UDP port 4	R/W	0000h	

Table 8.5. Memory Register List < 3 / 3 >

Register number	Function	Access	Initial value	Supplement
REG108	Enhanced roaming	R/W	Disable	0: Disabled 1: Enabled
REG109 to REG100	Channel Number	R/W	2000H	Specify multiple channels via the bits Can only be set when enhanced roaming is enabled. REG109 bit0: Channel 1 specification bit1: Channel 2 specification bit2: Channel 3 specification bit3: Channel 4 specification bit4: Channel 5 specification bit5: Channel 6 specification bit6: Channel 7 specification bit7: Channel 8 specification REG110 bit0: Channel 9 specification bit1: Channel 10 specification bit2: Channel 11 specification bit3: Channel 12 specification bit4: Channel 13 specification US: 1 ~ 11, EU: 1 ~ 13
REG111	Roaming threshold	R/W	80	50 to 150
REG112	RSSI sampling time	R/W	3	1 to 10
REG113 to REG118	Preferred AP1	R/W	Set 0 to all	
REG119 to REG124	Preferred AP2	R/W	Set 0 to all	
REG125 to REG130	Preferred AP3	R/W	Set 0 to all	
REG131 to REG136	Preferred AP4	R/W	Set 0 to all	
REG137 to REG142	Preferred AP5	R/W	Set 0 to all	0: Disabled 1: Enabled
REG143	Login to other than preferred AP5	R/W	Enabled	0: Disabled 5: 40bit 13: 128bit
REG144	WEP Key 1 Size	R/W	5	
REG145 to REG157	WEP Key 1	R/W	Set 0 to all	
REG161	WEP Key 2 Size	R/W	0	0: Disabled 5: 40bit 13: 128bit
REG162 to REG174	WEP Key 2	R/W	Set 0 to all	
REG178	WEP Key 3 Size	R/W	0	0: Disabled 5: 40bit 13: 128bit
REG179 to REG191	WEP Key 3	R/W	Set 0 to all	
REG195	WEP Key 4 Size	R/W	0	0: Disabled 5: 40bit 13: 128bit
REG196 to REG208	WEP Key 4	R/W	Set 0 to all	

Note: In the "Access" column, "R" indicates read

Table 8.6. Device ID vs. IP Address Table (For Communication via a Router Only)

Device ID	Description	Access	Initial value	supplement
000 to 254	IP address	R/W	000.000.000.000	Device ID and IP address

Note: In the "Access" column, "R" indicates read and "W" indicates write.
This table defines the correspondence between device ID and IP address.
It is required for communication with devices on the other side of an IP router.
It is not required for communication within the same network group.

Glossary

IEEE (Institute of Electrical Electronics Engineers)

"I-triple-E," involved in a wide range of fields from communications and computer to medicine and biology, with primary activities related to publishing articles and sponsoring conferences, but also recommending and setting of standards. The organization sponsoring Committee 802, which is responsible for LAN related matters.

IEEE 802.11/ IEEE 802.11b

The wireless LAN standard established by the IEEE.

MIB (Management Information Base)

The value of a MIB is determined by the Internet standard control information structure.

SNMP (Simple Network Management Protocol)

A function necessary for network control, provides three functions: Get (acquire), Set (modify), and Trap (notify event). Conceived as an easily installable control protocol that places as little load on the network as possible.

Diversity

A method of using multiple antennas, and selecting the one with the best receiving conditions.

LAN (Local Area Network)

A network configured from mutual connections between computers within a limited area. Also called an "intranet" or "business or regional data communications network."

RSSI (Receive Signal Strength Indication)

A numeric indicator of incoming signal strength

Spectrum diffusion transmission

A method of transmission in which signals that are normally transmitted over a given limited frequency band undergo narrow band modulation (primary modulation), then again diffuse modulation (secondary modulation) to intentionally diffuse the signal over a broad frequency spectrum.

DS (Direct Sequence)

A type of spectrum diffusion signal using narrow band modulation with phase modulation, in which the diffusion is by means of phase modulation using a broad band diffusion signal (pseudo random strings).

CSMA/CA (Carrier Sense Multiple Access with Collision Avoidance)

CSMA is a method of avoiding collision by which wireless terminals listen before transmitting and do not transmit if they can year transmissions from other wireless terminals. CSMA/CA is CSMA plus additional collision avoidance functions.

Hidden Terminal Problem

When wireless terminals are farther apart then their electric signals can reach, or their signals are obstructed by objects, neither may be able to receive the other's signals. Any two such wireless terminals are said to be hidden from each other. In Ad Hoc mode, because the carrier sense function is not effective between hidden terminals there is a higher probability of collisions and throughput (the volume of information sent in a given time interval) is reduced.

RTS (Request to Send)

In communication via AP, transmission is controlled by CSMA/CA plus RTS. In RTS, a wireless terminal asks the AP if it is all right to transmit, and only transmits after an OK-to-send acknowledgement signal is returned. This serves to avoid unnecessary collisions when hidden terminals exist because hidden terminals cannot transmit.

Roaming

This term has the same meaning as roaming for a portable phone or PHS. The AP is in the role commonly called the 'antenna/base station' for the phone or PHS, and the user unit is in the role of the phone itself.

Peer-To-Peer

A network in which two or more nodes can communicate directly with each other without going through another device.

AP (Access Point)

In the FLEXLAN-DS110 series, access points serve as the bridge between wired networks and wireless networks, as well as providing bridge functions between segments and IP tunnel functions indispensable to the building of versatile, large-scale networks.

User Unit

In the FLEXLAN-DS110 series, this refers to the FX-DS110-PCC or a device with the FX-DS110-PCC built in.

ESS ID (Extended Service Set ID)

In the FLEXLAN DS110 series, the ESS ID is like a name assigned to the wireless LAN network to which a unit belongs. The same name must not be given to more than one wireless terminal. Conversely, a wireless network can be partitioned by using different ESS ID names.

Channel

This term has the same meaning as a television or radio channel. In the 2.400 to 2483.5GHz ISM band used by this product, the IEEE 802.11 standard provides for division into 11 (FCC model) or 13 (CE model) channels numbered 1 to 11 or 13. Even on the same network, wireless devices operating on different channels cannot communicate with each other.

Multi-channel Operation

By changing channels on adjacent access points, it is possible to obtain higher throughput per wireless terminal than when is channels are not changed, even when the number of wireless terminals is increased.

The 2.4G ISH band (2400 to 2483.5 MHz) in which this product operates is subdivided into 11 (FCC model) or 13 (CE model) channels, numbered 1 to 11 or 13, by IEEE standard 802.11. Because each frequency has sidebands around its central frequency, sidebands on adjacent channels overlap. Overlapping frequencies can adversely affect communications by interference with each other's transmissions.

Refer to Figure 8.4. when selecting channels, to ensure that frequency bands do not overlap.

The maximum number of channels that can be used simultaneously without interference is four, by using a combination of channels 1, 6, 11. Channel numbers can be set from 1 to 11 using utility software.

Two wireless terminals on the same network cannot use the same frequency.

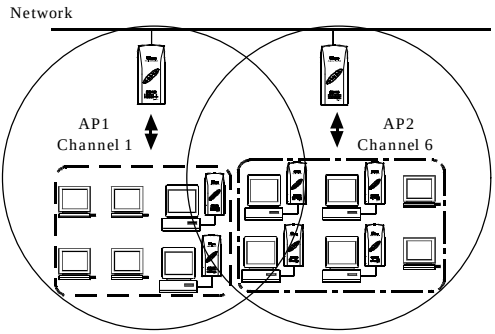


Figure 8.3. Multi-channel Operation

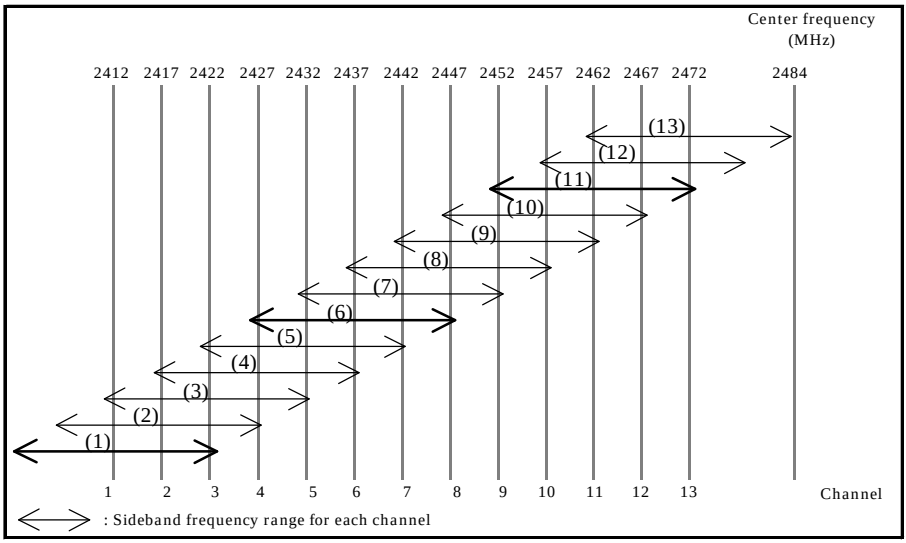


Figure 8.4. Channel Frequencies

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